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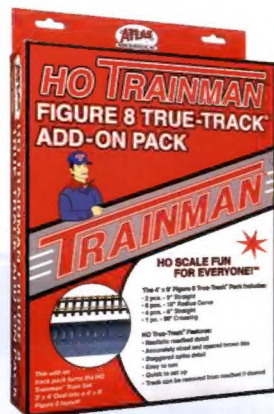
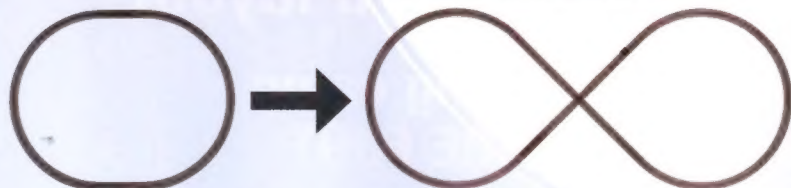


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Contents 12/09

Volume 76,
Number 12



On the cover: The *Model Railroader* staff shows you how to build a backdrop for your layout, as well as paint hills, trees, and clouds. Bill Zuback photo

6 Brighten up your layout

From the Editor by Neil Besouglhoff

8 Now on ModelRailroader.com

The latest features on our Web site by Dana Kawala

10 News & Products

Hobby industry news and product announcements by Steven Otte

18 MR Sweepstakes rules

20 Railway Post Office

Letters from our readers by Eric Stelpflug

24 Car orientation in unit coal trains

Information Desk by Jim Hediger

28 Dust covers

Workshop by Jim Hediger

BACKDROP SPECIAL

34 Building a backdrop

Step by Step by David Popp

► Online bonus ModelRailroader.com

38 You, too, can paint a backdrop

Easy backdrop painting for first-time artists by Steven Otte

42 Wunderland goes to Switzerland

This massive display layout expands yet again by Erhard Baltrusch

► Online bonus ModelRailroader.com

48 Troubleshoot a DCC layout

Five steps to find, correct, and prevent problems by David Popp

52 A modeler's guide to gondolas

Facts about transition-era cars and how to model them by Tony Koester

58 Adding operations to a layout

How to develop and manage operating sessions

by Brooks Stover ► Online bonus ModelRailroader.com

64 Model a small logging camp

How to build basic camp structures and equipment by Jeff Johnston

68 The main line of the Minutemen

Modeling 1950s railroading on the Boston & Maine by Thomas Oxnard

76 DCC and turnouts

DCC Corner by Mike Polsgrove

78 Product Reviews

Athearn's HO Union Pacific gas-turbine, Broadway Limited's sound-equipped N scale E8s . . . and more by Dana Kawala ► Online bonus ModelRailroader.com

92 Trackside Photos

98 Everything is relative

Trains of Thought by Tony Koester

100 Cartoon

113 Index of Advertisers

114 Authority to use the main line - part 1

The Operators by Andy Sperandio



Coming next issue: We begin construction of the Union Pacific's Salt Lake Route, our exciting new 4 x 9-foot N scale project railroad. Jim Forbes photo

kicks butt ► adjective informal superbly awesome; must be ordered immediately: *the new LRC locomotive from Rapido Trains Inc. kicks butt.*



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RAPIDO

Pre-production model shown. Final model will have redesigned truck sideframes, roof rivets, finer windshield wipers, polished window "glass" and other improvements.

From the Editor

Brighten up your layout

Neil Besougloff, Editor



For most of us, the days are short and the nights are long this time of year. Darkness, however, should not envelop your layout.

Model railroads are usually built in basements, garages, and spare rooms, often without much forethought to lighting. Room lighting can be simple or costly, and, depending on the nature of your layout room, adding appropriate lighting may require an electrician.

But lousy lighting makes it difficult to see as you build your layout and operate trains. It also makes your layout look old and dull to family members and friends. Frankly, dim layout lighting takes away some of the joy of being a model railroader.

Here are a few things I've learned over the years to brighten things up:

- Install overhead lighting before you get started on a layout. It doesn't have to be complicated. In the basement of my previous home, I bought six halogen shop lights and hung them from the exposed floor joists above. The bright halogen bulbs made my layout practically glow. The shop lights were on sale at a home center for less than \$20 each.

- Different bulbs create different types, or "colors," of light. Without getting into the science of lighting, fluorescents generally emit cool, bluish-white light. Incandescents give off a

warm, slightly yellow light, and halogens are hot white. The newer pigtail compact fluorescent bulbs, though initially bluish-white, are now available in incandescent-like tones. Different types of light effect the personality of your layout, making your scenery look "warm" or "cool" depending on your landscape's palette. Personally, I like the warmer colors.

- Keep the number of extension cords from getting out of control. In my old basement, each shop light came with a stubby cord that plugged into an outlet. The cords were nowhere near long enough, so I ended up with a scary grid of extension cords criss-crossing the ceiling. In my present house, I had electrical boxes installed overhead, and then I added ceiling tiles and track lighting. It looks professional, and I can also aim each light fixture to illuminate a feature of my layout.

- Control your layout lighting with wall switches. Recalling my old layout one last time, I had to walk around the basement to pull six chains every time I wanted to turn on the lights.

- Lastly, be safe and get yourself a sturdy six-foot step ladder. Don't go cheap; you don't want to admire your new lighting while flat on your back.

NEIL BESOUGLOFF

Contributing to Model Railroader

We welcome contributions from our readers, including articles, photographs, and prototype drawings. For detailed information on submitting material to MR, contact our editorial associate Eric Stelpflug at 262-796-8776, ext. 583, or mrmag@mrmag.com. *Model Railroader* assumes no responsibility for the safe return of unsolicited material. We assume unsolicited material is intended for publication by Kalmbach Publishing Co. unless otherwise noted. We assume letters, questions, news releases, and club news items are contributed gratis.

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LAYOUTS and layout building Share your layout plans, ask for help, and see what others are building. If you're building a model train layout, this is where to go. If you're a hobbyist, please read our forum policies.	Re: Allen's Trains... 08-25-2009 10:55 AM	14,288	138,881
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On page 64 of this issue you'll find Jeff Johnston's article on how he modeled a logging camp scene. For more ideas on logging structure projects, you won't want to miss *Modeling logging railroads, vol. 2*.

This featured download is 31 pages long and includes five articles. Along with an overview of logging camp structures, other articles describe loading practices and skidder rigging. You'll also learn about methods for making various types of trees and see an example of an HO model railroad that's built for prototypical logging operations.

Visit www.ModelRailroader.com/InfoStation and save 30% on *Modeling logging railroads vol.2* today!



New online videos

Subscribers get more at ModelRailroader.com, including several new videos each month. Beginning on page 34 of this issue, you'll find two stories on how to build and paint a model railroad backdrop. Click on Modeling projects under the Articles tab to find a video of one of our staff illustrators showing basic backdrop painting techniques.

You'll also find video demonstrations of new locomotive models on our Product Reviews page. And for more new products and modeling tips, you don't want to miss the Modeler's Spotlight videos with Cody Grivno.



Layout tour



On page 42 you'll find a story showing some of the latest scenes added to what may be the largest model railroad in the world. Check out the Online extras box on our home page to see a video of the spectacular Minatur Wunderland.



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News & Products



HO scale Union Pacific Electro-Motive Division DD40AX Centennial diesel locomotive. Bachmann's model of the largest diesel-electric locomotive ever made is in hobby shops now. The eight-axle EMD road diesel is powered by two skew-

wound motors with four flywheels, giving it plenty of pulling power. It's also equipped with a dual-mode Digital Command Control decoder and E-Z Mate Mark II magnetic knuckle couplers. The model has a suggested retail price of \$125.

Hobby news

Former LGB executive dies:

Rolf Richter, 55, former managing partner of LGB train manufacturer Ernst Paul Lehmann Patenwerk, died Sept. 25 in a traffic accident. Among his survivors is his father, Wolfgang Richter, who with Rolf's uncle, Eberhard, created LGB.

National Z Scale Convention planned: The first National Z Scale Convention is scheduled for April 30-May 1, 2010, in Medford, Ore. The initial convention will be sponsored by Micro-Trains Line Co., but responsibility for subsequent events will be turned over to a committee of volunteers, Micro-Trains said in an announcement. The convention will include a trip to Medford's Railroad Park, a public train show, clinics, contests, a banquet, and a tour of the Micro-Trains factory. As more information becomes available, it will be posted at www.micro-trains.com/NZC_2010.php.

HO scale locomotives

Alco RS-3 diesel locomotive.

Chicago & North Western, Delaware & North Western, Great Northern, Pennsylvania RR, Rutland, and St. Louis Southwestern (Cotton Belt). Two road num-

bers each. Five-pole skew-wound motor with machined brass flywheels, prototype-specific stack and pilot details, and McHenry scale magnetic knuckle couplers. \$89.98. January 2010. Ready-to-Roll. Athearn Trains

Electro-Motive Division GP40-2W diesel locomotive.

Canadian National (four road numbers available), GO Transit (early version), Guilford Rail System, and Huron Central. Three road numbers each unless noted; also available undecorated. Five-pole skew-wound motor with flywheels, prototype-specific details, and Accumate magnetic knuckle couplers. Direct-current model, \$179.95; with Digital Command Control and QSI Quantum sound, \$289.95. Ready-to-run. Master Line. Atlas Model Railroad Co.

HO scale freight cars

United States Railroad Administration 55-ton two-bay hopper kit. Chesapeake & Ohio (three-pack only); Clinchfield (single car only); Delaware, Lackawanna & Western (single car); and Erie RR. Accumate magnetic knuckle couplers. \$12.98 each; three-packs, \$37.98. Accurail

26-foot high-side ore car. Canadian Pacific, Southern Pacific

(with and without side extensions), and Union Pacific (maintenance-of-way scheme). Three differently numbered six-packs each, plus single car (19 car numbers each total). Upgraded ex-Model Die Casting tooling, wire grab irons, ore load, and McHenry scale magnetic knuckle couplers. Single car, \$16.98; six-pack, \$99.98. Ready-to-Roll. Athearn Trains

United States Railroad Administration rebuilt steel boxcar.

Atchison, Topeka & Santa Fe; Atlantic & Danville; Kansas City Southern; Pennsylvania RR; Roscoe, Snyder & Pacific; and Vermont Ry. Two numbers each; also available undecorated. Separately applied wire grabs and side ladders, brake detail, and Accumate magnetic knuckle couplers. \$32.95 (undecorated, \$26.95). December 2009. Ready-to-run. Master Line. Atlas Model Railroad Co.

60-foot machinery flatcar.

Atchison, Topeka & Santa Fe (Super Shock Control lettering); Burlington Northern; Elgin, Joliet & Eastern; Southern Ry.; Trailer Train; and Union Pacific. Six numbers each. Metal wheelsets and Kadee magnetic knuckle couplers. \$29.95. March/April 2010. Ready-to-Run. InterMountain Railway Co.

► Highlighted in this issue

- 12 Con-Cor HO scale Pennsylvania RR class MP54 passenger cars
- 13 Electro-Motive Division SD40-2 diesel locomotive in HO scale by Athearn

- 14 Club cars
- 16 HO scale Thrall covered hopper three-packs from Atlas Trainman line
- 16 List of manufacturers

Steven Otte



16,000-gallon-capacity Funnel Flow tank car. Archer Daniels Midland, J.M. Huber Corp., Procor, Specialty Minerals (UTLX reporting marks), Omya (SHPX reporting marks), and Union Tank Car. Modeler-installed wire grab irons, metal wheelsets, and Proto-Max magnetic knuckle couplers. \$27.98. January 2010. Ready-to-run. Gold Line. Wm. K. Walthers Inc.



International Car Co. steel caboose kit. Detroit, Toledo & Ironton. One-piece cast-resin body with separate cupola, roof, and underframe. Etched-metal parts, Tichy brake gear, and Tahoe Model Works trucks. \$56.95. WrightTrak Railroad Models

HO scale passenger cars

Bombardier bi-level commuter car. Altamont Commuter Express, Northstar Commuter Rail, and West Coast Express. Full window glazing and interiors, metal wheelsets, and McHenry scale magnetic knuckle couplers. Cab car, \$35.98; coach, \$35.98; three-car set (two coaches and one cab car, differently numbered from the individual cars), \$107.98. Ready-to-Roll. January 2010. Athearn Trains

Union Pacific lightweight sleeping cars. *Imperial*-series 4-double-bedroom, 4-compartment, 2-drawing-room car and *Placid*-series 11-double-bedroom car. Appropriate for *City of Los Angeles*, *City of San Francisco*, and *Challenger* passenger consists; both also available undecorated. Modeler-applied wire grab irons, metal wheelsets, and Proto-Max magnetic knuckle couplers. \$64.98. *Imperial*-series available now; *Placid*, January 2010. Ready-to-run. Wm. K. Walthers Inc.

HO scale structures



Troels Kirk Cannery. Wood craftsman kit can be built as a complete diorama or as two separate structures. Limited run of 100 kits. Cast-metal details and etched-brass lobster traps with lobsters. \$124.99 plus \$15 shipping and handling. Full Steam Ahead

Grand Trunk/Canadian National lineside structure kits. Laser-cut wood kits. Specially cast windows and doors and color-coded strip-wood from Mt. Albert Scale Lumber. Section house, \$44.95; bunkhouse, \$15.95; and speeder shed, \$9.95. Also available in a set of all three plus a tool house, \$79.95. Kanamodel Products

Danielson Building kit. Laser-cut wood siding, roof shingles, Tichy Train Group windows and doors, and cast foundation and steps. Footprint 3" x 5½". \$45. Motrak Models



Steel deck truss bridge kit. Laser-cut matboard. Includes two 5" high bridge abutments. 7.4" long, \$52.99; 14.65" long (pictured), \$74.99. Noch GmbH & Co.



Colton depot kit. Stucco-finish Spanish Colonial Revival-style station based on Atchison, Topeka & Santa Fe prototype in Colton, Calif. Includes laser-cut walls, windows, doors, awning cover, roofing, graphics, and waiting benches. Footprint 3½" x 13½". \$82.95. Sidetrack Laser

Ethanol plant corn storage silos and elevators. Kit includes two concrete silos, long and short elevators, and conveyor bridge. Unpainted styrene kit. \$69.98. North American Ethanol series. Wm. K. Walthers Inc.



Citizens Savings & Loan. Factory-assembled and painted. \$64.99. Built-and-Ready Landmark Structure series. Woodland Scenics

HO scale details and accessories

Ford F-850 flatbed truck with boom crane. Atchison, Topeka & Santa Fe; New York Central; Pennsylvania RR; Rock Island; Southern Ry.; and Union Pacific. Interior with separate steering wheel, movable boom, and rolling vinyl tires. \$24.98. January 2010. Ready-to-Roll. Athearn Trains

Canadian provincial vehicle license plates. Alberta (1950 to present); Manitoba (1950 to present); New Brunswick (1950 to present); and Nunavut (enough for 10 vehicles; 1990 to present). Set includes tags for at least 20 vehicles unless noted. Printed on photo paper. \$1.50 per set includes shipping. Howard's Hobby



HO scale Pennsylvania RR MP54 passenger cars. Built starting in 1910, some of these Pennsylvania RR 64-foot passenger cars lasted as late as the 1970s. Con-Cor's HO scale models of the early, pre-electrification cars are offered painted for seven lines, plus an unlettered Tuscan Red version. The cars come with detailed and lighted interiors, metal wheelsets, and magnetic knuckle couplers. A set of one coach and one combine sells for \$119.98.



Cushion draft-gear boxes. Cast-styrene kits. Freightmaster ME-10 or ME-15 cushion unit, \$6.95 per pair; 10-pair fleet pack, \$66. Moloco

Coal loads. Cast resin. For ExactRail AutoFlood II hoppers. Two-pack, \$5.95. Motrak Models



Assorted figures. One or two hand-painted plastic figures per pack, some with accessories. Man with backache, man sweeping the floor, or sailor, \$3.99. Customs officer, beggar, priest waiting for train, flower seller, security man, wood chopper, or clown, \$4.99. Customs officer in safety vest, police officer at desk, wash day, couple walking, or man pulling donkey, \$6.99. Feeding the rabbits or children with wooden wagon, \$7.99. Paul M. Preiser GmbH

40-foot smooth-side container. K-Line, Maersk, Orient Overseas

Container Line, Sea-Land, Seatrain, Showa, United States Line, and YS Line. Also available undecorated. New body style, fully assembled. \$5.98. January 2010. Wm. K. Walthers Inc.

N scale locomotives

Alco C-420 phase 2 diesel locomotive. Apache Ry. (two road numbers available), Erie Mining, Green Bay & Western (limited edition, one number), Iowa Interstate (limited edition, one number), Louisville & Nashville, Monon (two numbers), and Norfolk & Western. Three numbers unless noted; also available undecorated. Scale Speed motor, prototype-specific fuel tank and nose, and Accumate magnetic knuckle couplers. Direct-current model, \$119.95 (limited-edition models, \$124.95); with Digital Command Control and sound, \$154.95 (limited-edition models, \$159.95). Ready-to-run. Master Line. Atlas Model Railroad Co.

Two-truck Shay steam locomotive. Argentine Central, East Side Logging, New York & Pennsylvania, and Pickering Lumber. All-wheel drive and electrical pickup, Digital Command Control, and separately applied grab irons. \$199.95. Master Line. Atlas Model Railroad Co.

Electro-Motive Division SD45T-2 diesel locomotive.

Bessemer & Lake Erie (four road numbers available); Canadian National (Duluth, Missabe & Iron Range reporting marks, three numbers); DM&IR (three numbers); and St. Louis Southwestern (Cotton Belt). Four numbers each unless noted. Etched-metal details and Micro-Trains magnetic knuckle couplers. \$119.95. March/April 2010. Ready-to-run. InterMountain Railway Co.

N scale freight cars

52-foot gondola with load.

Canadian National, CP Rail, Denver & Rio Grande Western, Milwaukee Road, Soo Line, and Union Pacific. Available with painted and weathered scrap or coil load. Separately applied brake wheels, metal wheelsets, and truck-mounted McHenry magnetic knuckle couplers. \$16.98. Ready-to-run. Athearn Trains

50-foot flatcar with trailer.

Atchison, Topeka & Santa Fe; Canadian National; Canadian Pacific; Jersey Central; Missouri Pacific; and New York, New Haven & Hartford. Two car numbers each; also available undecorated. Accumate magnetic knuckle couplers. \$11.95 (undecorated, \$9.95). Trainman series. Ready-to-run. Atlas Model Railroad Co.

86-foot auto-parts boxcars.

Double-door: Milwaukee Road and New York Central. Quad-door: Pennsylvania RR. Etched-metal details, cushion draft gear enclosures, and operating magnetic knuckle couplers. Single car, \$24.95; two-pack, \$49.90. Ready-to-run. Bluford Shops

62-foot insulated boxcar with 10'-6" door.

Cryo-Trans, Denver & Rio Grande Western, Southern Pacific, Tropicana, and Union Pacific. Eight car numbers each. Micro-Trains trucks and magnetic knuckle couplers. \$24.95. Spring 2010. Ready-to-run. Made by Red Caboose, distributed by InterMountain Railway Co.

Five-unit articulated double-stack well car.

New road numbers: Trailer Train (TTX reporting marks). Injection-molded walkways, brake wheel details, and magnetic knuckle couplers. Designed for use with Walthers 40-

and 48-foot intermodal containers (sold separately). \$49.98. Ready-to-run. Wm. K. Walther's Inc.

N scale passenger cars

10-roomette, 5-double-bed-room sleeping car. National Railways of Mexico (one name), New York Central (postwar paint scheme), Pennsylvania RR (Fleet of Modernism and Missouri Pacific through-service schemes), and Southern Pacific (*Lark* as-delivered and *Sunset* paint schemes). Four names/numbers per car unless noted. Detailed and lighted interior, wire grab irons, and Micro-Trains trucks and magnetic knuckle couplers. \$39.95. Spring 2010. Ready-to-run. Made by Centralia Car Shops, distributed by Inter-Mountain Railway Co.

N scale structures



Granny's House. Factory assembled and decorated plastic structure. \$59.99. Built-and-Ready Landmark Structures line. Woodland Scenics

N scale details and accessories

McHenry magnetic knuckle couplers. Compatible with all N scale magnetic knuckle couplers. One pair, \$3.98; six pairs, \$19.98; 25 pairs, \$49.98. Athearn Trains

Assorted intermodal containers and trailers. K Line 40-foot container chassis: two-pack, \$21.95. Maersk 40-foot refrigerated container: five-pack, \$33.95. Xtra Leasing 53-foot American Highways Trailers: two trailer numbers available, \$17.95 each. First quarter 2010. DeLuxe Innovations



AutoScenes figure and vehicle assortments. Suds & Shine (pictured): three teens washing a



HO scale Electro-Motive Division SD40-2 diesel locomotive.

Athearn has upgraded the details on its HO scale SD40-2, including the m.u. hoses and uncoupling levers. The Wisconsin & Southern "Grow Wisconsin" scheme shown here is one of 10 paint schemes shipping to stores now. The ready-to-run diesels sell for \$99.98 or \$109.98, depending on road name.

car. Carburetor Chaos: Three mechanics working on an old truck. \$15.99 each. Woodland Scenics

O scale locomotives

Alco C-628 and C-630 diesel locomotives. C-628: Delaware & Hudson, Lehigh Valley, and Pennsylvania RR (new paint scheme). C-630: Canadian Pacific and Southern Pacific. Two road numbers each per powered locomotive, one number per unpowered locomotive. QSI Digital Command Control with Quantum sound, twin flywheel-equipped motors, and separately applied metal details. \$499.95 (unpowered, \$229.95). Ready-to-run. Atlas O

O scale freight cars

Association of American Railroads 70-ton capacity three-bay open hopper. Baltimore & Ohio, Chesapeake & Ohio (new road numbers), Chicago & Eastern Illinois, Peabody Coal Co., Reading RR, and Texas & Pacific. Removable coal load, prototype-specific flat or arched ends, and magnetic knuckle couplers. \$45.95. Ready-to-run. Trainman line. Atlas O

40-foot wood refrigerator car. Blatz, Simpson Products Co., Red Top Milk, and White Rock. Also available undecorated. Separately applied door hinges, handles, and latches, die-cast metal stirrups, and magnetic knuckle couplers. \$79.95. Ready-to-run. Atlas O

O scale structures

Small telegraph office. Designed from Northern Pacific prototype. Laser-cut walls, doors,

windows, roof shingles, and detailed interior. 2½" x 3¼" footprint. \$36.95. Sidetrack Laser



Fenster's Farm Fresh. Laser-cut wood kit. Includes more than two dozen white metal details. \$149.95. Bar Mills Scale Model Works

O scale details and accessories



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S scale structures

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News&Products

Club cars



Pullman-Standard 2,893-cubic-foot-capacity covered hopper. Athearn car in non-prototypical Revere Sugar paint scheme offered by the South Shore Model Railroad Club. Twenty-five car numbers available. Etched-brass running boards, metal wheelsets, and magnetic knuckle couplers. \$24.95. Shipping \$5 for first car, \$.50 extra for each additional car. Check or money order to: Club Car, c/o Dave Clinton, 11 Hancock Rd., Hingham, MA 02043. For more information, go to ssmrc.org.

interior. Footprint 9" x 9". \$129.95.
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Z scale locomotives

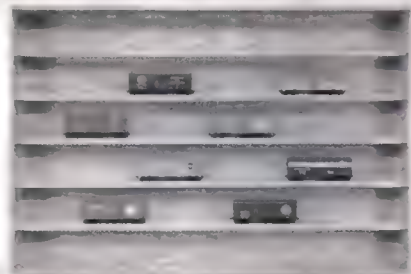
Electro-Motive Division SD40-2 diesel locomotive. CSX. Two road numbers available. Magnetic knuckle couplers. \$185.95. Ready-to-run. Micro-Trains Line Co.

Z scale freight cars

Assorted hopper cars. Western Maryland 33-foot two-bay exterior-post hopper car (with ball herald) two-pack; metal wheelsets and magnetic knuckle couplers. Detroit, Toledo & Ironton 40-foot three-bay offset-side 70-ton hopper four-pack; Hay Bros. Garage coal loads and magnetic knuckle couplers. Ready-to-run. Prices to be announced. Full Throttle

Assorted freight cars. New York Central 40-foot flatcar with generator loads (two car numbers available), \$19.10. Chesapeake & Ohio center cupola steel caboose, \$23.95. Kopper's Co. 39-foot single dome tank car (two numbers), \$22.60. Canadian National 40-foot standard boxcar with paper grain doors, \$26.85. Maintenance-of-way blacksmith and shower camp car (undecorated kits), two-pack, \$39.95. All have magnetic knuckle couplers and are ready-to-run. Micro-Trains Line Co.

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Z scale structures

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Military mess hall. Laser-cut microplywood kit. \$27.95. Micro-Trains Line Co.

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Books

8 Realistic Track Plans for Small Switching Layouts. By Lance Mindheim. Includes eight easy-to-build, operations-oriented track plans for small spaces, including the Port of Palm Beach, New York Dock Ry., and a Pennsylvania RR branch line. 56 pages. \$19.95. The Shelf Layouts Co. Inc.

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1. No Purchase Necessary. Official entry forms are bound in the December 2009, January 2010, and February 2010 issues of *Model Railroader*. The *Model Railroader* 2010 Sweepstakes is open to residents of the United States and Canada (except Quebec) only, 18 years of age or older. Employees (and their dependents and immediate household members) of Kalmbach Publishing Co., their advertising and promotional agencies and sponsoring companies are not eligible to participate.

2. Sweepstakes Entry. To enter, complete and mail the official entry form or a postcard with name, address, city, state or province, and zip or postal code to: *Model Railroader* 2010 Sweepstakes, P.O. Box 1199, Waukesha, WI 53187-1199. Or enter online by filling in the Online Entry Form and hitting the SUBMIT ENTRY key. The Online Entry Form must be filled out completely to be eligible. Incomplete or defaced entry forms are void. One entry per household. The *Model Railroader* 2010 Sweepstakes begins on October 23, 2009 and the official ending date for the *Model Railroader* 2010 Sweepstakes will be at 11:59 pm Central Standard Time on April 1, 2010. All entries must be transmitted or postmarked no later than that date.

3. Prizes and Odds of Winning. One drawing will be held on or around May 31, 2010 for the following awards: One (1) Grand Prize consisting of a \$2,000.00 Gift Certificate redeemable at the hobby shop of the winner's choice (selected retailer must be listed in at least one yellow pages directory under "Hobby & Model Supplies - Retail") (Total retail value is \$2,000.00). One (1) First Prize consisting of products from Broadway Limited: (1) BLJ-2090 PRR Centipede #5828A1/A2 Set, Brunswick Green, Gold Leaf Lettering, 5-Stripe Passenger scheme, both units w/ Paragon2 Sound/DC/DCC, HO. (Retail value is \$449.99). (1) BLJ-2011 GE AC6000, GE Demonstrator #6001, Low Ditch Lt., Paragon2 Sound/DC/DCC, HO. (Retail Value is \$249.99). (1) BLJ-2052 PRR I1sa 2-10-0, #4250, Original Headlight, 90F82 Short Tender, Paragon2 Sound/DC/DCC, HO. (Retail Value is \$399.99). Total retail value is \$1,099.97. One (1) Second Prize consisting of a Walther's Cornerstone Series Package: (1) Transfer Table - HO Scale (Retail Value \$329.98). (1) Transfer Table Pit Extension - HO Scale (Retail Value \$69.98). (1) Railroad Shop - HO Scale (Retail Value \$69.98). (1) Engineering Office - HO Scale (Retail Value \$44.98). (1) Car Shop - HO Scale (Retail Value \$49.98). Total retail value is \$564.90. One (1) Third Prize consisting of a \$350 gift certificate from Nicholas Smith Trains. Total retail value is \$350.00. Three (3) Fourth Prizes each consisting of a \$100 gift certificate from Micro-Mark (Retail Value \$100.00, each). Ten (10) Fifth Prizes each consisting of a one-year subscription to *Model Railroader* (Retail value is \$42.95 each). Cash equivalents of merchandise will not be awarded. Substituting prizes is not allowed. Any applicable federal, state, and/or local taxes are the responsibility of the winner. Odds of winning depend on the number of entries received. Total circulation for *Model Railroader* is 147,042. Sweepstakes void in Quebec and void where prohibited.

4. Validation and Acceptance. Winners in the *Model Railroader* 2010 Sweepstakes will be selected in a random drawing. Canadian prize awards subject to skill test requirement. By entering the sweepstakes, participants agree to be bound by these official rules and all decisions of Kalmbach Publishing Co. Sweepstakes entries void if not legible, not completed in full, not obtained legitimately, or if forged, photocopied, mechanically reproduced, late or tampered with. The potential winners may have to sign and return an Affidavit of Eligibility, publicity release and Release of Liability within fourteen (14) days of notification. In the event of non-compliance, alternate winners will be randomly drawn. No responsibility is assumed for lost, stolen, misdirected or late entries or notifications. All sweepstakes entries become the property of Kalmbach Publishing Co. and will not be returned.

5. Winners' List. For a list of winners, send a stamped, self-addressed envelope to: *Model Railroader* 2010 Sweepstakes Winners' List, P.O. Box 1612, Waukesha, WI 53187-1612. Residents of FL, VT, and WA may omit stamp. Requests must be received by July 31, 2010. Or check the *Model Railroader* web site (www.ModelRailroader.com) after August 31, 2010.

6. Kalmbach Publishing Co. shall not be liable for any injury, loss, damage, cost or expense arising, directly or indirectly, in connection with sweepstakes and the prize awarded.

7. Sponsored by Kalmbach Publishing Co., P.O. Box 1612, Waukesha, WI 53187-1612 on with sweepstakes and the prize awarded.

75th anniversary convention

As president of the National Model Railroad Association, I want to thank editor Neil Besougloff for the kind words he wrote about the NMRA and our upcoming 75th anniversary convention in his October column.

This one will truly be special as we celebrate 75 years of model railroading in the city where both *Model Railroader* and the NMRA were born in the 1930s.

I'm also happy to report that NMRA membership is no longer required to attend our national conventions. All of MR's non-NMRA-member readers should consider this my personal invitation to attend our 75th anniversary convention July 11-18, 2010, in Milwaukee.

We promise everyone, member and non-member alike, a great time! Full convention details and registration information are available on our Web site, www.nmra.org.

Mike Brestel
Cincinnati

Prototypical farming

I just read the Scenery Step by Step section about planting crops in a field in the October issue of *Model Railroader*. I own a farm and have a correction to offer.

Farmers cannot afford to waste the area MR called a turnaround. It's true that this area is used for that purpose, but the planter is then run around the edge of the field at a 90-degree angle to the rest of the crop. That way, all the land is used for production of the crop and no land is left unplanted.

The process is then reversed when the crop is ready to be harvested.

George Ardwin
Sabina, Ohio

Infrared sensors

I'd like to point out two facts regarding my article, "Simple train detection for staging tracks," which was published in the October 2009 issue of *Model Railroader*. First, that article shows two infrared sensors and one turnout behind a view block. If two turnouts are used, such as a passing siding behind a view block, then the two infrared sensors could still be used, but with one at each end. The light-emitting diodes (LEDs) could be changed to two reds.



To learn more about detailing a passenger station, read the October 2009 issue of *Model Railroader*. V.S. Roseman photo

Passenger station scenes

I was all set to relegate a small passenger station to an obscure corner of my California-themed N scale layout, when I saw the special on station modeling in the

October 2009 *Model Railroader*. I became so inspired that I'm now making plans to make the passenger station a major feature.
Jeff Whitehorn
Simi Valley, Calif.

When going into a passing siding or a yard, one red LED would come on and then go off. The train must be stopped quickly on the second red. The second red would remain on, indicating which track is in use and the direction of the train.

The second fact is that this simple infrared circuit works fine for reasonably dark areas. High amounts of ambient light, such as incandescent overhead lights or sunlight in your train room, will trigger this sensor.

By making the size of the 470K resistors smaller, the "S" sensor can resist higher amounts of ambient lighting. However, the sensing distance to the bottom of a HO car becomes less. Other possible resistor values include 220K, 100K, or 47K.

If the quantity of ambient light becomes a problem, commercial infrared sensors could be used. These commercial circuits are more advanced and compensate for ambient lighting.

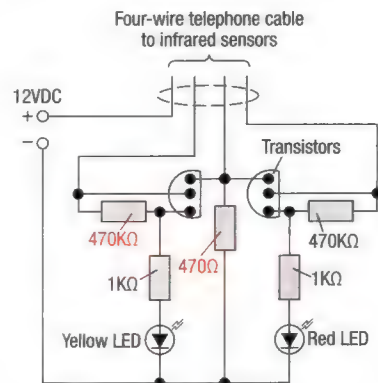
Robert Frey
Greendale, Wis.

Correction

Robert Frey's article "Simple train detection for staging tracks" on page 65 in the October 2009 issue of *Model Railroader* contained

an error in the wiring diagram. The upper left and center resistor values are reversed. As shown in red on the corrected illustration below, the center resistor should be 470Ω and the left resistor should be 470KΩ.

The error was introduced by the MR staff and is not the fault of the author. — Ed.



Comments, suggestions, and additional information on *Model Railroader* articles and departments are welcome in this column. Every comment will be read, but not all can be printed or answered. Make your statement in 300 words or less, and send it to Railway Post Office, *Model Railroader* magazine, P.O. Box 1612, Waukesha, WI 53187, or e-mail rpo@mrmag.com. Please include your name, city, and state.

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01306 Explorer DCC Pass. Set, Asstd. Rds. 219.99
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PROTO 1000

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#41230 F3A or F3B, DCC & SOUND 169.99

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#31476 GP-20 89.99
#31496S GP-20 W/QUANTUM SOUND 159.99
#31899 GP-20 HI-HOOD 89.99
#31897S GP-20 HI-HOOD W/QUANTUM SND 129.99
#31924 GP-20 UNDEC. SUPER SALE 39.99

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#31331 RS-27 79.99
#31333S RS-27 W/QUANTUM SOUND 129.99
#31365S U-288 W/QUANTUM SND 159.99
#31401S U-308 W/QUANTUM SND .STARTING AT 109.99

PROTO 2000
#31058 U-288 69.99
#31110 U-308 69.99

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#40775S FM W/DCC & SOUND .STARTING AT 159.99
#47775 FM DCC READY .. .STARTING AT 99.99

PROTO 2000
#31123 GP9 89.99
#40850S GP-9 W/DCC & SOUND 159.99
#47850 GP-9 DCC READY 89.99

PROTO 2000
#30740 SD-45 .Starting At 29.99
#30719 SD-45 39.99
#30850 SD-50 89.99
#30830 SD-50 39.99

PROTO 2000
#40725S SD-7 W/DCC & SOUND 159.99 EA.
#47725 SD-7 W/DCC READY Starting At 74.99 EA.

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#30140 SD-7 (B&O Only) SALE 49.99

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#30519 GP-18 89.95 EA.
#30680 GP-18 HI-HOOD 99.99 EA.

PROTO 2000
#30534 GP-40 59.99

PROTO 2000
#30155 SD-60 89.99 EA.

PROTO 2000
#40100 ALCO PA BLOWOUT A/B SET \$69.99 ea.
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#30953 ALCO PA A/B \$129.99
#30494 PROTO 2000 PENNSY ALCO PA A/B A-UNIT \$64.99

PROTO 2000
#21349 S-1 ALCO \$49.99 Ea.

PROTO 2000
#30965 Proto 2000 S-3 \$76.99 EA.
#30056 CHESSIE SWB \$49.99 Ea.

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#30201A Proto 2000 FA2, POWERED
#23437A Proto 2000 FA1, POWERED

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SALE
#30211 0-6-0 Starting At 99.99

SALE
#23302 0-8-0 STEAM LOCO ... 179.99

SALE
#60001S USRA, HEAVY 2-10-2 SND/DCC 229.99
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#40450S GP-7 W/SOUND Starting At 119.99
#40851S GP7 W/DCC & SOUND 159.99
#47851 GP7 DCC READY ... 89.99

PROTO 2000
#40452 GP-7 89.99
#40450S GP-7 W/SOUND Starting At 119.99
#40851S GP7 W/DCC & SOUND 159.99
#47851 GP7 DCC READY ... 89.99

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#31820 GP38-2
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#41400 W/DCC & SOUND 159.99
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SALE
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#30776 GP38-2
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#31040 GP38-2
#41400 W/DCC & SOUND 159.99
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SALE
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#40950 AB SOUND 339.99
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#31703 E-8 A NO SOUND 89.99
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#41350 ES UP "CITY" STREAMLINED AB with SOUND 339.99
#48350 ES UP "CITY" STREAMLINED AB NO SOUND 229.99
#41351 ES UP "CITY" STREAMLINED A or B with SOUND 174.99
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Many utility-owned unit coal trains are made up of gondolas. This one is a "bathtub" car with under-floor troughs for added capacity. Jim Hediger photos



This high-capacity hopper is owned by a car leasing company. One end has a rotary coupler so it can be unloaded in a dumper or through its hopper doors.

The importance of car orientation in unit coal trains

Many unit train gondolas have one end painted a different color, presumably the end that has a rotating coupler. I assume all the cars in a train should be aligned, but is there any rule about their direction facing front or back? Also do any unit trains run with some cars aligned to the front, and some to the back?

*Bill Quick
North Charleston, S.C.*

Unit trains made up entirely of coal gondolas must be arranged with all of their rotary coupler ends facing the same direction for delivery to a rotary dumper. The rotary coupler ends are generally facing forward and coupled to the locomotive on loaded trains. In this manner, everything remains coupled and the dumping rotation occurs with the couplers aligned at the pivot point.

Every pair of couplers must include a rotary coupler to pass through the dumper. If a car is reversed, two normal couplers will be together and the rotation will damage both cars. Even so, most of today's rotary car dumpers are sized to empty two cars at a time.

Occasionally, a unit train car must be set out for repairs. It'll normally be picked up on the return trip of the car's original consist to maintain the proper car count. Since these trains often pass through a reverse loop at the dumper or the mine, occasionally cars end up facing the wrong way. However, the conductor delivering the loaded train is responsible for making sure all of its cars are oriented properly. Any odd ones are usually turned on a wye before the train leaves the yard.

Early unit coal trains often had a special car just ahead of the

caboose with rotary couplers at both ends. This special car let a narrow bay-window caboose pass through the dumper without uncoupling. Most cupola cabooses wouldn't clear the dumper, so they had to be dropped off on arrival.

Some unit-train hoppers have rotary couplers so they can be dumped either way, depending upon the power plant's equipment. If the customer dumps its coal through the hopper doors, the orientation of the rotary couplers is immaterial, so this type of train could have cars facing either way.

A few utilities in the northern part of the United States operate unit trains of rotary hopper cars as a backup measure. If the rotary dumper fails during bad winter weather, they can still bottom-dump the inbound coal to keep the power plant going. — *Jim Hediger, senior editor*

Locomotive classification

Union Pacific locomotive numbers 5248-5553 are listed on the roster as class C45AC-CTE. This classification seems to follow General Electric's standard nomenclature of C for six axle, 45 for 4500 horsepower (not the usual 4400?), and AC for the electrical system, but what does CTE mean?

Jerry Weisman, Carlsbad, Calif.

The CTE designation indicates the locomotive is equipped with a feature called Controlled Tractive

Effort, a software package created by GE that gives the engineer remote control of locomotives in separate consists throughout the train. Commands from the lead locomotive are sent over a radio link to the remote locomotive(s).

The computer system allows the engineer to synchronize all of the locomotives, or to independently monitor and control the remote locomotive(s) for smoother and safer train handling. In this way, the engineer receives input on conditions in his train so he can

reduce the throttle(s) on the remote locomotive(s) to keep the helpers from pushing too hard when that could cause a mid-train derailment.

Also, the UP's C45AC-CTE locomotives have the same 4,400 hp as its other similar units. However, the UP wanted a way of identifying its CTE units and added a 1 to the unit's horsepower number resulting in the "45" designation.

From what I could see on the roster, the UP has installed the CTE feature on quite a few of its other big road engines. — *J.D.H.*

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Fig 2:
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Fig 3: CURRENT METER

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Information Desk



Pennsylvania Power & Light engine no. 1 is a rare 0-6-0F fireless steam switcher that's been saved for future restoration and museum display. Dave Kalman photo

Fireless cooker

I recently drove through Lewis-berg, Pa., and noticed this unusual locomotive parked on a siding with several other pieces of Pennsylvania and Erie rolling stock. Can you tell me what it is and provide a history of this locomotive?
Dave Kalman, Towson, Md.

Pennsylvania Power and Light locomotive no. 1 is an unusual type 0-6-0F steam locomotive that was donated to the Conrail Historical Society for historic preservation in 1999. It's a fireless steam switcher built by the H.K. Porter Co. of Pittsburgh in 1949. It spent its entire 50 years of service working at PPL's Sunbury power plant in Shamokin Dam, Pa.

This unusual type of locomotive has no firebox, so it can be used in confined areas and places where there's a potential fire hazard. During the steam era, fireless engines were commonly employed in chemical works, refineries, and ammunition or explosives plants.

These engines have a heavily insulated boiler that serves as a large Thermos bottle. It's charged with high-pressure steam and superheated water from a stationary boiler connection within the plant. The locomotive then uses this steam in the normal fashion until the boiler pressure runs low. At that time, it's reconnected to the steam source and recharged to resume its in-plant switching work. — J.D.H.

Send your questions about prototype railroading to Information Desk, *Model Railroader* magazine, P.O. Box 1612, Waukesha, WI 53187, or e-mail proto@mrrmag.com. We regret we can't answer all the questions we receive.

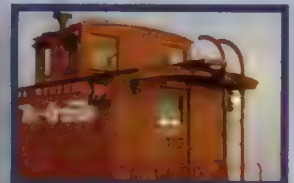
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Fig. 1 Dust cover. A clear, corrugated acrylic plastic dust cover sits on removable dowel brackets on Bob Rothe's HO layout. Bob Rothe photos

Dust covers to protect your layout

Dust is a problem for most model railroads, even in the cleanest homes. Here's a solution I use to significantly reduce my dust problem, especially on the long, straight areas of my layout.

Figure 1 shows a dust cover I made of lightweight, corrugated acrylic plastic. This material is sold by most hardware and home improvement stores. The plastic is sold in 8- and 12-foot lengths that are 26" wide. They're just about a perfect fit over my HO Yampa Valley RR's yards, which are 20" to 24" wide. However, I've found the long panels are a bit unwieldy, so I've kept the maximum length of my individual covers between six and eight feet. The plastic can be cut with a power saw with a sharp, fine-toothed blade.

I use removable brackets made of dowel rods and pipe fittings to support the dust covers. They're painted silver in the photos. These brackets slip into sockets made from 5" long metal tubes mounted on the fascia. Each socket has a long screw that passes through the bottom of the tube to form a stop. Then I added a U-shaped pipe bracket to secure the top of the tube, and painted everything brown to match the fascia.

The support brackets consist of 5/16" wood dowels that slide easily through 1/4" copper pipe fittings. I began by cutting a pair of dowel risers that drop into the sockets to support the corrugated plastic an inch or two above the tallest item on the layout. Next, I cut another dowel to span the layout

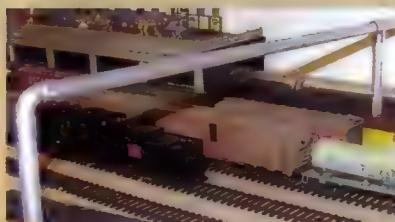


Fig. 2 Fittings. Bob uses wood dowels epoxied into pipe fittings to make his supports. The T at one end is for final adjustments.



Fig. 3 Short riser. Some supports have a shortened riser (right) that sits on top, between tracks, and uses a pin to hold it in alignment.

and slipped it onto the risers using an elbow on one end and a T fitting on the other. See **figs. 2** and **3**. Using the T let me make a lateral adjustment to obtain a perfect fit. Finally, I marked the positions of the parts, took the bracket apart, and secured the joints with 5-minute epoxy.

I use three brackets, positioned near the ends and in the middle of each yard, so I can overlap two shorter lengths of plastic near the middle. I can easily remove these dust covers and the supports in a few seconds and set them out of sight while I entertain guests. — *Bob Rothe, Boulder, Colo.*

L-girder modifications

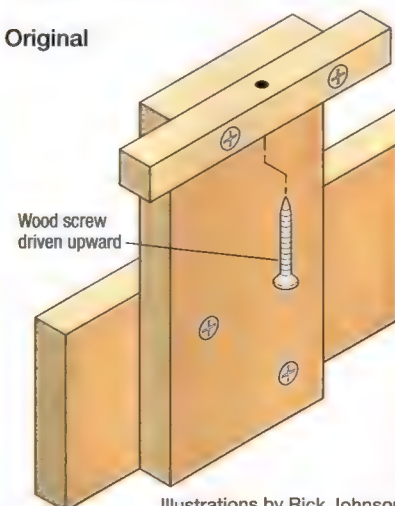
I ran across an old "MR Clinic" article in the January 1978 *Model Railroader*. In it Gordon Odegard revisited some of Linn Westcott's innovative L-girder benchwork methods and offered some modifications to speed up construction using glue and nails instead of screws. Since then I haven't found any subsequent discussion. What are your views? *Fred Scheer, Severna Park, Md.*

My HO Ohio Southern was built with technical advice from both men, so it has a combination of their techniques. Linn preferred wood screws to fasten everything, as he wanted to prevent damage from the impact of hammering. He did use glue to assemble the 1 x 2 top flange along the top edge of his 1 x 4 L-girders. Then the rest of the benchwork was assembled using screws driven upward from underneath so they would never be covered up by track or scenery.

As we gained experience with the L-girder system, Gordy began looking for ways to simplify the construction process and speed things up. Combination drill-and-countersink bits helped, but drilling holes and driving screws from underneath was awkward and time-consuming.

To assemble his L-girders, Gordy used a combination of white glue and a few nails. His reasoning was the fasteners were only there to keep the boards aligned until the glue set. Once dry, the glued joints provided plenty of strength in the L-girders.

Original



Illustrations by Rick Johnson

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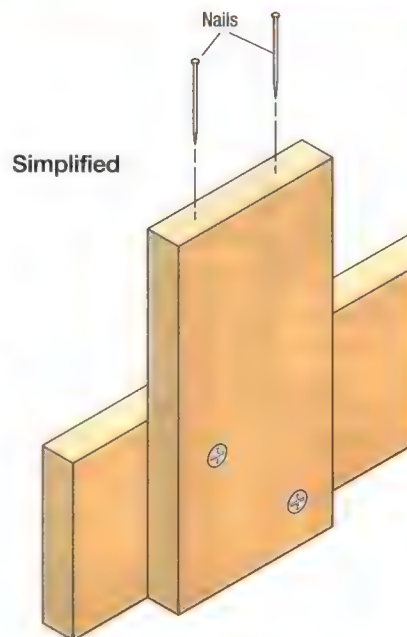
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Gordy simplified his risers by eliminating the cleat Linn used across the top to attach his track boards. Gordy still attached each riser to the benchwork with a pair of screws, but he nailed the track boards on from the top using finishing nails driven into the riser's end grain. He felt that most layout changes involved changes in elevation that could still be easily adjusted by removing the screws that held the riser in place.

My contribution was finding a thin 1½" finishing nail that carpenters use to apply cabinet moldings and other trim. I used these trim nails to fasten the track board to the riser, but found that I had to be a bit more careful to drive them straight. If a riser must be moved laterally, it's easy to remove the screws and pull the riser off the trim nails from below. Then I use large Vise-Grip pliers, with a block of wood for leverage, to pull the small trim nail heads right down through the track board, leaving the track above undisturbed. — *Jim Hediger, senior editor*

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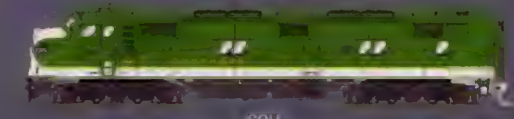
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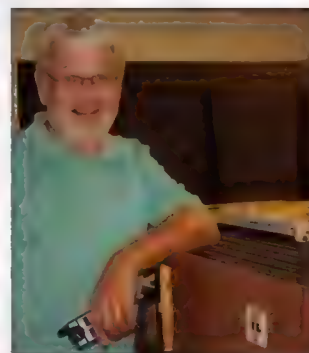
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This photo shows the complete process (right to left) David used to make a backdrop for *Model Railroader's* HO scale Turtle Creek Mine Branch. Jim Forbes photos

Building a backdrop

I am always amazed when I think about how long it took me to start building layouts with backdrops. While I had worked for years on improving my modeling techniques and scenery skills, for me, the discovery of how much a backdrop improved the overall appearance of a model railroad was a long time coming. These days, backdrops are simply a part of my planning process for all new projects.

However, if you have an existing model railroad that doesn't have a backdrop, don't think that adding one means that you'll need to build a new layout. Even a simple blue sky with a few clouds can usually be shoehorned into place behind your existing scenery with minimal effort. And the result will be such a dramatic improvement over that 1970s dark-walnut paneling, you'll wonder why you'd waited so long.

To give you an idea of how to build a basic backdrop, I constructed one for our Turtle Creek Mine Branch. (See the January through April

2005 *Model Railroader* for more information on this layout.) The techniques I used here can be applied on a much larger scale to most any freestanding benchwork.

There are many ways to build backdrops, and I've included four examples here. In fact, most mid-size and larger layouts use more than one method to support the sky.

On my previous HO scale layout I'd painted the layout room walls with the same blue paint I used on my backdrops. See the first illustration. This is about as easy as a backdrop option gets.

However, in many locations on that layout, I also used tempered hardboard panels supported by 1 x 2 posts that were bolted to the benchwork, as shown in the second illustration. This method works very well if you need your backdrop to curve. Simply attach hardboard to both sides of the posts for a double-sided backdrop.

On my N scale layout, I have one section of backdrop made from two freestanding sheets of .080" styrene sandwiched together. The styrene fits into a slot in the foam scenery, as shown in the third illustration. The rest of my N scale layout's backdrop is made from .080" styrene mounted to frames made

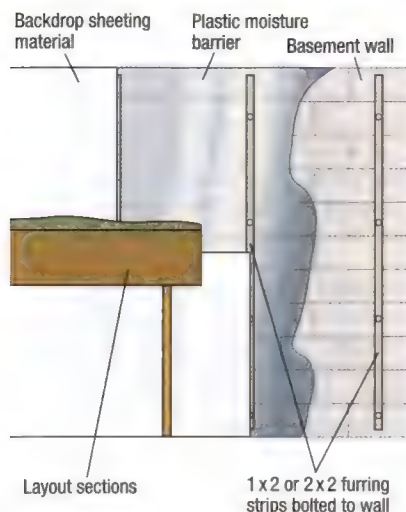
from 1 x 2s. The frames are fastened to the benchwork with screws. As shown below, I used this same technique on the Turtle Creek Mine Branch to support a tempered hardboard backdrop, which is the example I'll use here.



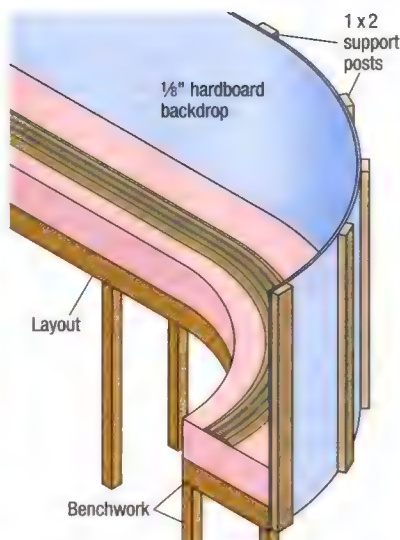
Frame backdrop. This type of backdrop is built on a frame made from 1 x 2s and is ideal for straight layout sections, such as modules.

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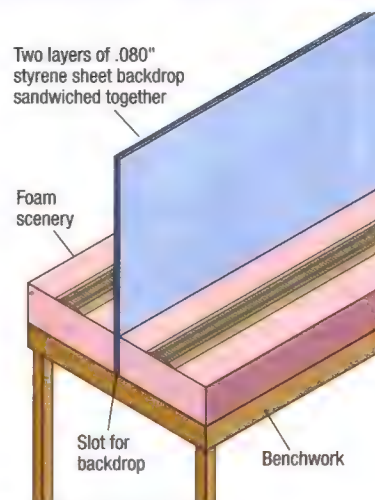
Visit www.ModelRailroader.com to watch a video of *Model Railroader* illustrator Jay Smith demonstrating how to paint backdrop clouds.



Backdrop wall. You can paint directly on the walls of your layout room if they have a smooth, finished surface. Otherwise, as shown here, you can attach a backdrop made of styrene or tempered hardboard to the walls.



Support-post backdrop. In this example, 1 x 2 support posts hold up the backdrop. The posts are attached to the benchwork, and the backdrop can be affixed to one or both sides. This method works well for backdrops that follow curves.



Illustrations by Rick Johnson

Freestanding backdrop. In some applications, you can make a simple backdrop that divides two areas of a layout without using support posts. In this example, a sheet of styrene is set in a slot cut into the layout's foam scenery.

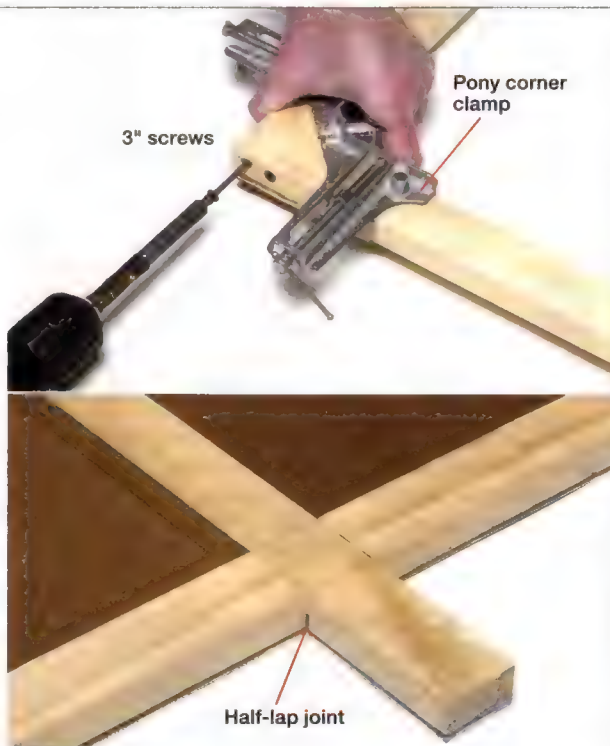
Step 1 Building backdrop frame

I started the project by building a 2 x 6-foot frame for the backdrop using clear pine 1 x 2s. As with benchwork construction projects, you want to use clear, straight lumber. Although clear pine boards are a bit more expensive, and it will take you longer to sort through the pile to find the straight ones, the extra effort will pay off in a backdrop that is easy to build and looks good when it's finished.

My backdrop frames have cross members on 24" centers. Although you can make your backdrop frames virtually any size and shape you wish, it's best to provide good support for the surface material, in this case 1/8" tempered hardboard, which tends to sag if there is too much distance between supports. Crossmembers on 24" centers work well to keep the surface smooth.

You'll also probably note from the photos that I made the two inner cross members longer than the others. These are 27 1/2" and extend 3 1/2" below the bottom of the frame. The extra-long supports connect to the benchwork on the Turtle Creek Mine Branch and are fastened with 1/4" carriage bolts and wing nuts.

To fit the crossmember support posts into the backdrop frame, I used half-lap joints. To do this, cut notches the width of a 1 x 2 in both the crossmember post and the bottom frame piece at the location of the joint. I used my table saw to cut the notches, but you can also make half-lap joints using a circular saw or a router. You can also make half-lap joints the old fashioned way by making saw cuts at the edges of the joint and then removing the material in the middle with a wood chisel.

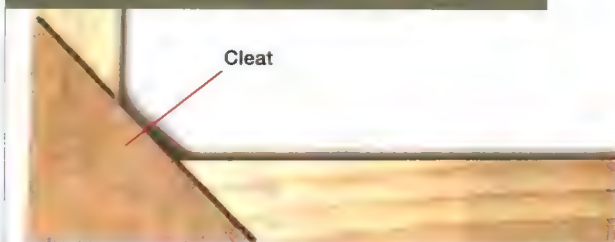


After checking to make sure the parts for the half-lap joints fit together flush, I set them aside until it was time to assemble the frame.

While I used half-lap joints on this project, the frames on my own layout are simple rectangles without any support posts. The bottom of the frames bolt directly to the benchwork.

Step by Step

Step 1 Building backdrop frame (cont'd)



Assembly. To assemble the frames, I began by setting a sheet of plywood on several sawhorses in my garage to make an assembly table. Except for the two half-lap joints, all the frame joints are made with yellow carpenter's glue and secured with two 3" screws. Be sure to drill

holes for the screws first to avoid splitting the frame parts. I countersunk the screw heads for a flush finish.

This is one of those projects where you can't have enough clamps. Years ago I purchased a set of four Pony corner clamps, as shown in the photo on the previous page, and they make it very easy to build square corners with tight joints. You'll find a variety of other clamps useful for this project as well, including spring and bar types.

Once the frame was assembled, I added a cleat made from a 4" x 4" triangle piece of 1/8" plywood to each outside corner. Though the frame will be reinforced when the surface material is glued to it, I like the added security the cleats provide in keeping everything square until I get to that step.

Step 2 Adding the surface



The next step is to add the surface material to the backdrop. I've used several materials for backdrops in the past, but I tend to stick with either .080" styrene or 1/8" tempered hardboard. Both materials have smooth surfaces and produce good results. However, cost is

also a factor. You can purchase approximately three 4 x 8 sheets of tempered hardboard for the cost of one 4 x 8 sheet of styrene, so for this project I used the hardboard. After cutting the hardboard to size, I attached it to the frame. You can use nails or screws to attach the hardboard, but that adds a lot of work in the next couple of steps because all of those holes will need to be filled.

If you've got the time, you can avoid extra work by gluing the hardboard to the frame. I used yellow wood glue for this step. After applying the glue liberally to the frame, I set the hardboard in place and clamped it until the glue set – about two hours. It takes approximately a dozen clamps to do one 8-foot section of backdrop, so I can make 16 feet of backdrop in an evening. More clamps would make the project go even faster.

Backdrop seams. Where two backdrop frames meet, bolt or screw them together for form a solid joint. Where pieces of hardboard meet within a frame, make sure that the seam has a backing board. Although it's ideal to place the seam over a frame crossmember, this isn't always possible. A seam that falls in the middle of the frame will need to be supported before it can be sealed. Glue a scrap piece of wood behind the hardboard to support the seam, or simply add an extra crossmember to the frame at that location, as shown in the photo.

Step 3 Smooth seams



Before you can paint the backdrop, you need to seal the seams. The first step is to make sure the seam is level. The cut edge of hardboard often has a small lip on it left by the saw blade. I use a razor scraper to remove that lip, as shown in the photo. Working carefully to avoid gouging the surface, I run the scraper along the surface of the seam, removing any raised material. I then sand the seam to finish it.

Sometimes after doing this, the seam still isn't level. This is usually caused by varying thicknesses of the hardboard. If there's a big difference, I'll use a block plane to take away more material from the raised side.

Step 4 Taping seams

For a smooth backdrop, you should tape the seams. The process is just like drywalling a house. Start by covering the seams with fiberglass drywall tape. This is a self-adhesive mesh that keeps the drywall mud from cracking or falling out of the joint. I found an ultra thin version made by Saint-Gobain Technical Fabrics at my local home center. The thinner tape eliminated the need for a third application of drywall mud.

The photo shows the entire taping process in one shot. (Normally you'd complete each part before moving on to the next.) After applying the fiberglass tape, coat it with a thin layer of drywall mud, using a 4" drywall knife. Let the mud dry overnight (make sure it doesn't still feel damp), and then lightly sand the seam to remove any high spots. Vacuum up the dust and wipe the seam's surface with a damp paper towel.

Next, apply a second coat of mud, this time with a 6" drywall knife. Feather the edges of this coat by pressing the knife blade firmly against the tempered hardboard, taking care not to remove too much mud from the taped seam. After the second coat has dried, sand the seam smooth and then evaluate whether or



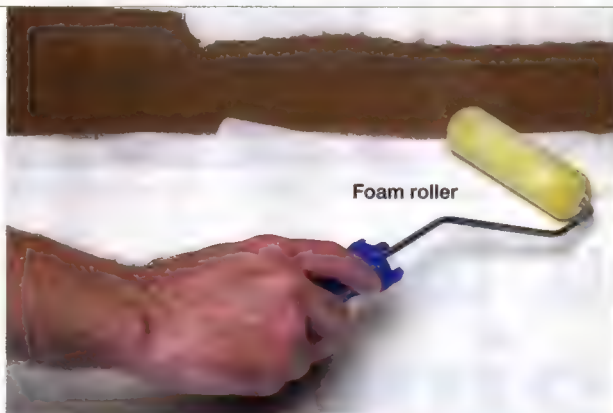
not it needs a third application of mud. Don't be tempted to skimp. If the seam needs another coat, it needs another coat. For the third application, use an 8" drywall knife and follow the previous steps.

These successively wider coats of drywall mud make for a smooth transition from the flat surface of the hardboard, over the taped seam, and back again.

Step 5 Primer

Once the taping is complete and the drywall mud is dry, you can prime and paint the backdrop. The surface of tempered hardboard varies between manufacturers. Some are quite porous and will soak up a lot of paint. Others, however, are much harder, making it difficult for ordinary latex wall paint to adhere properly. Coating the hardboard with a primer will produce a surface that promotes good paint adhesion.

For this project, I used Bin latex primer, which is easy to clean up with water. I applied two coats of primer an hour apart, and then let the backdrop dry overnight.



Step 6 The sky is the limit

If you're planning on using a photo backdrop, you can apply it once the primer is dry. However, if you're planning on painting your own backdrop, it's time to apply your base sky color.

I used an inexpensive latex wall paint in a generic sky blue color that I purchased at my local hardware store. I applied two coats of blue paint with a foam roller for a smooth finish, and then I let the backdrop dry overnight again, just like I did with the primer.

While I've painted a lot of clouds using an airbrush, I wanted to try something different this time, so I followed the steps for painting clouds in Kaimbach illustrator Jay Smith's backdrop painting article in the June 2008 issue of MR. I also used Bruce Petty's article on painting hills from the January 2008 issue.

To apply the clouds and hills, I used several sizes of artist paint brushes. For paint I used washes of Polly



Scale Reefer White and CSX Gray for the clouds and UP Dark Gray, CSX Gray, and some nameless shade of purple for the hills. To learn more about painting your own backdrops, read associate editor Steven Otte's article beginning on page 38.

Backdrops are an important part of any finished model railroad scene. If you don't already have one on your layout, I hope that you'll give it a try. **MR**



Some rolling stock and structures give associate editor Steven Otte an idea of how his new backdrop will look once this part of his home layout is complete. Follow along as Steve relates the highs and lows of his first adventure in painting.

You, too, can paint a backdrop

A first-time artist shares how he created this rural Ohio vista

By Steven Otte

Photos by the author

I've been modeling the Cincinnati, Lebanon & Northern Ry. on paper for 16 years. But other than a garage layout that didn't get past the benchwork stage before I had to move, the railroad existed only as cardboard boxes full of homeless structures.

Until now. An HO scale version of the CL&N is gradually taking shape in my Milwaukee basement. I've finished the first section of benchwork, built a staging yard, and started laying visible track. But before I can go any further, I need a backdrop.

I considered commercial backdrops, but I couldn't find anything suitable for my railroad's setting of rural Ohio in 1906. I also weighed making my own photo backdrop, but I didn't look forward to the hours of work it would take to digitally edit out anachronistic details like power lines, modern buildings, and automobiles.

That left painting. However, this is new territory for me. My only previous

experience with painting involved a roller. Then I realized that at some point, all modelers have to do something for the first time. It's how we learn. So, I consulted co-workers and books like Mike Danneman's *Painting Backdrops For Your Model Railroad* (Kalmbach Books), then rolled up my sleeves and got to it.

It took four attempts before I was happy with my results; my wife jokes that my backdrop is so thick with layers of paint there's barely enough room on the shelf layout for trains. Follow along while I tell you what worked for me and what didn't, and maybe you'll pick up a tip or two to help you tackle your own backdrop painting project.

STEP 1 Preparing the backdrop

I built my backdrop out of 2-foot-wide $\frac{1}{8}$ " Masonite, attached to furring strips spaced 16" apart along my basement wall. In order to minimize the visible nail heads on the surface, I used Liquid Nails for Projects to glue the Masonite to most of the strips. I used wire nails only on the ends of the sheets and where I needed the backdrop to curve.

The joints between the sheets didn't always fall at a furring strip. Where this happened, I used Liquid Nails to attach a length of 1 x 4 to the wall behind the joint, then glued and tacked the Masonite sheets to it to keep the joint flat. I hammered wire nails into the Masonite, then covered the joint and the nail heads with spackling compound that I later sanded smooth.



Steve uses a sanding block to smooth the spackling compound covering the joint between two panels of his backdrop. Once he covers it with a painted blue sky, clouds, trees, and hills, the joint will be invisible.

STEP 2 Blue sky



After painting his backdrop sky blue, Steve added white to one side of the tray and mixed the colors on the roller. The next band of paint would then fade from blue to a lighter color.

Even on a cloudless day, the sky isn't the same shade of blue in every direction. Since we are looking through a thicker layer of atmosphere toward the horizon than when we look up, sky blue fades to a lighter, paler shade near the horizon. Therefore, I wanted my backdrop's sky to be a deeper blue at the top and near-white at the bottom.

I used flat latex house paint from my local home improvement center to paint the backdrop. My first attempt involved painting the sky solid blue with a roller, then blending white paint up from the bottom with a broad brush. I tried it both while the blue paint was still wet and after it dried, but either way, I wasn't happy with the visible white brushstrokes. So I painted blue over it and tried again, this time using a water-



Once it dries, the band of paint being applied here will be darker, blending on the top with the unlightened sky blue above it. When he paints the next band below, Steve will add more white paint to make it even lighter.

dampened roller to blend a band of white into the blue above. Not only did I not like the way it looked on the backdrop, I end up spattering myself with light-blue water. So once the water dried, the Masonite gained its third layer of blue paint, providing me with a blank canvas to try another new idea.

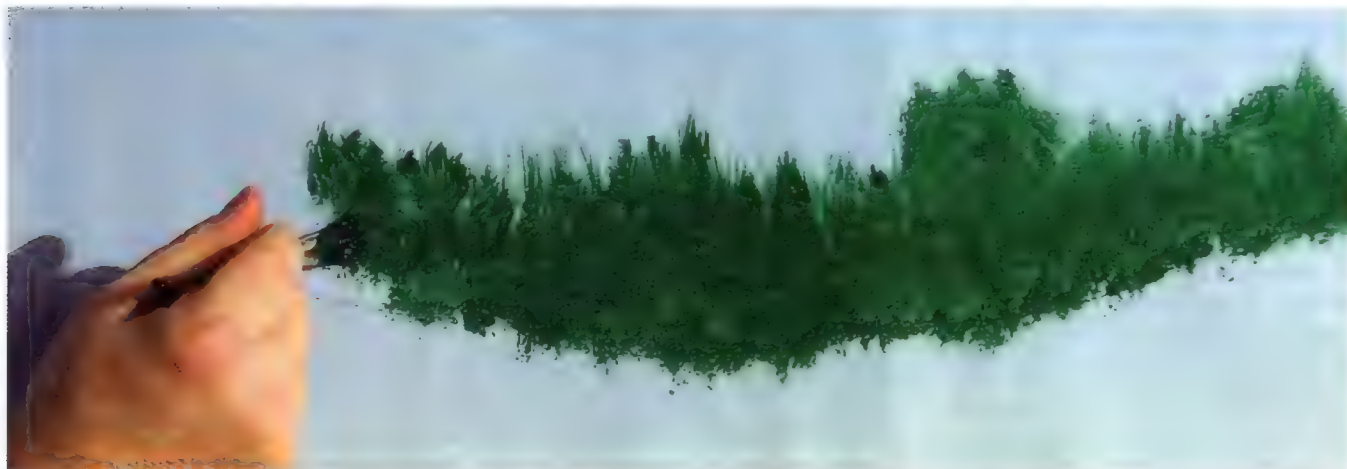
The problem was, no matter what I used to try to blend the colors, the colors didn't transition from one to the other smoothly. They still obviously looked like two separate, poorly mixed colors of paint. I needed a way to blend the colors before they went on the backdrop. That's when I hit on the method I finally used.

I painted the topmost band of the backdrop with straight blue, using the roller. After finishing the top, I added

white paint to the blue that remained in the paint tray, pouring it carefully on only one side. I then rolled the roller in the tray, blending the two shades in the middle. I used this to paint the next band on the backdrop, keeping the "dark" end of the roller at the top. When the paint on the roller ran low, I went back over the edges of the just-painted band to blend the colors together. I did two more bands the same way, adding more white each time.

I was happy with the blending effect, so I stayed with it, even though the bottom of my sky ended up drying to a darker shade of blue than I expected. If I had to do it again, I'd put less blue in the tray to start with, so that by the time I reached the bottom I'd be using almost pure white paint.

STEP 3 A distant treeline

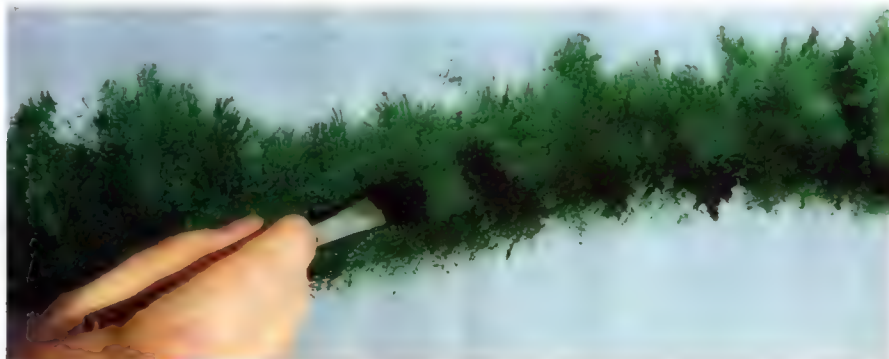


Following an undulating hilltop penciled on the backdrop, Steve stipples on medium green paint in a row of rough, random shapes to represent a distant treeline. A narrower treeline looks more distant; a wider one appears closer.

When it comes to my modeling, I like to call myself an impressionist. That is, I want my structures and scenery to make a good impression, not steal the show from the rolling stock that should be the stars. Similarly, I want my backdrop to be a supporting player to the foreground scenery, not upstage it. I want to capture the feeling of southern Ohio's rolling woodlands, not accurately depict a particular scene.

The approach I was looking for was perhaps best exemplified by *Joy of Painting* instructor Bob Ross, famous for showing Public TV viewers how to paint peaceful landscapes. It's been a while since I had watched the show, but I remembered enough to paint my own "happy little trees."

I wanted my backdrop landscape to represent rolling meadows topped by a distant treeline, so I used a pencil to draw a wavy line denoting the hilltops. I then mixed some dark green paint with different proportions of white to make three shades of green. Using a 1/2" stiff-bristled brush in a stippling motion, I dabbed on the medium green paint to make a rough shape following the hilltops. After that dried, I went back with the dark green and stippled it heavily in random shapes extending up from the bottom of the tree line, to represent shadows. Then, using the lightest shade, I dappled the tops of the trees to represent leaves highlighted by the sun. When doing this, I kept the direction the sun should be shining on this part of the layout in mind, and made sure to highlight only the sunny sides of the trees. Finally, a few stripes and Y-shapes of gray-brown represented tree trunks and branches showing through the leaves and undergrowth.



Dark green paint, dabbed on the bottom of the treeline and up the back sides, represents shadows. Steve keeps the angle of the sunlight in this area in mind so he can keep the direction of the shadows consistent.



Dapples of light green on the treetops and on the sunny sides of the trees give the tree line depth. Stripes of gray-brown represent trunks and limbs. Steve doesn't try to keep the bottom line neat, because it will be covered by hilltops.

I showed the pictures of this step to David Popp, MR's managing editor, to ask his opinion. He said my painting technique was fine, but pointed out I would have trouble finding ground foam tinted to match the shade of paint I'd used. Trying to be economical, I'd used avocado paint I found in our new home's basement. For a while I went back and forth on whether to live with

the odd shade anyway, until I realized that I had also drawn the horizon line too low for the track elevations I had planned at this point. Out came the blue and white paint again, and the backdrop gained its fourth layer. The pictures you see here are of my second treeline, after buying new paint in colors more appropriate to the early-summer months I intend to model.

STEP 4 Clouds

While the trees dried, I turned my eyes again to the sky. I had painted clouds on the third layer of blue paint, the one with the avocado trees. Even though I liked how they came out, I knew I had gone overboard and crammed the sky with too many of them. I've seen plenty of days when the clouds were even thicker, but on my backdrop, the sky looked unrealistically crowded. The second time around, I had one thing in mind: Don't go nuts with the clouds.

I started with a round no. 1 brush and white paint, painting a succession of loose arcs to mark the tops of the clouds. We think of clouds as fluffy and soft-looking, but summer cumulus clouds often have a hard edge.

Once I had the basic shape I wanted, I dried the brush on a paper towel and drybrushed the interior of each cloud with white, again using small arcing motions. I wanted some blue to show through to give the clouds a variation of textures. Finally, I lightly brushed a slate gray on the bottoms.



Steve started painting his clouds with bright white arcs, representing cloud tops highlighted by the sun. Clouds look fluffy, but often have a hard edge.

When painting clouds, keep in mind how they arrange themselves in real life. We see them at all angles all over the sky because we are viewing them from below. But in reality, most of them lie at a single altitude. The ones nearer the horizon are more distant; they should appear smaller and whiter, both



After filling in the clouds with dry-brushed white paint, Steve uses gray to shadow the bottoms. Higher clouds should overlap lower ones.

because of their distance and because we see less of their dark bottoms. The higher they appear in the sky, the closer they are to us, so they should be larger and darker. This also means higher clouds should overlap lower ones. Look for some sky photographs in books or on the Internet to guide you.

STEP 5 Foreground

I intend to build a low wooded ridge between the track and the backdrop to help disguise the fact that the benchwork is only a foot wide in this area. Therefore, I painted the base of the backdrop's treeline between three and six inches above the track. The backdrop below that line will be partly obscured by trees on the layout, so it doesn't have to be detailed. I wanted to simply represent rolling farm fields.

I started by painting a strip of light grass green with a flat 1 1/4" brush, following the bottom of the treeline. The backdrop's texture gave this strip a rough edge which I thought looked like dappled shadows under the trees, so I didn't try to smooth it out.

Before that paint dried, I dipped the same brush in a more vivid green and painted another strip below that. With the wet brush I blended the edges together, bringing the more intense paint up the side of the hills facing away from the sun. This gave the terrain depth. I followed up with a strip of the medium green I'd used as the base color for the trees, again blending the edges and dragging it up into the valleys between the hills. Now I can build the scenic ridge and plant some trees to finish this section. **MR**



Steve wanted to paint a foreground that, when seen through trees that will be planted in the foreground, would look like distant grassy fields. Blending shades of green in a sweeping motion gives the impression of rolling terrain.



Steve pulls darker green paint from the foreground up onto the right sides of the hills, as well as into the lower areas between them. This helps visually reinforce that on this part of the layout, the sun would be shining from the left.

Wunderland goes to Switzerland



Hamburg, Germany's massive display layout expands again, this time across the Alps

By Erhard Baltrusch
Photos by Frank Zarges

Miniatur Wunderland is Hamburg, Germany's top tourist attraction, drawing almost half a million visitors each year. The spectacular HO layout boasts more than 900 locomotives, 1,900 turnouts, 250,000 lights, and 5½ miles – real miles, not scale miles – of main line. Since it opened in 2001 with displays focusing on southern Germany, we've added sections depicting railroading in northern Germany, Scandinavia, and the United States.

The American addition was the subject of an article in February 2006

Model Railroader. Since then, Miniatur Wunderland has gone south – to Switzerland, that is. Our latest expansion literally broke new ground, with the construction crew removing part of the floor to build Alpine terrain that in some places towers almost 20 feet above the main line.

Going down

Miniatur Wunderland's display occupies the fourth floor of the Speicherstadt, a historic warehouse complex in Hamburg. To make room for Switzerland, many of the workshops on the



A Rhätischebahn passenger train crosses the Landwasser viaduct, a landmark of Switzerland's Graubünden area, on the HO scale Miniatur Wunderland layout.

fourth floor of our building had to be relocated to the second floor. After a week of hard work, the electronics and model-building departments were almost completely moved. (Some of the staff stayed upstairs to let visitors watch them work.) However, this freed only some 750 square feet – not enough for our plans.

The solution was to build on both the third and fourth floors. Weird, I know, but Switzerland is a mountainous area. The only drawback was that the floor was reinforced concrete and couldn't be simply shoveled out. We rented a large



Lights twinkle to life as twilight falls over the Swiss city of Brichur. The scenery rises more than 20 feet from the valley floor to the summit of the mountains.

concrete-cutting circular saw, cut out the edges of our hole, and chipped out the rest with hammers and chisels. One week later, before any benchwork had been built or the first track had been laid, this work had already racked up some impressive figures:

- 22 tons of rubble from asphalt floor covering.
- 38½ more tons of rubble from reinforced concrete.
- 9½ tons of steel.
- 350 man-hours of labor.
- About 1 ton of dust in the adjacent rooms (and 25 upset colleagues).

Welded benchwork

The benchwork for this section of the layout wasn't as straightforward as we were used to. Older sections are built on open-grid wood benchwork. But to accurately model the Alps, we wanted to build mountains that would be 16 feet high, which would impose an immense load on the floor. So we ordered 16 tons of steel tubing and started welding the framework for the staging areas. We built the hidden staging yards at the same time as the framework, outside the layout, and installed them after the framework was up.



Brichur Station is ablaze with lights in this night shot. The Swiss section of the layout has about 25,000 light-emitting diodes for structure, street, and vehicle lights. Computers control lighting on the *Miniatur Wunderland*, taking the layout through a day-to-night cycle every 15 minutes.

Then we built the scenery framework above the staging framework. We also made this from welded steel tubing, since there would be a lot of plaster to support. Ladders and walkways had to be incorporated for later maintenance work. We also wanted our visitors to experience a walk right through the mountains, so we built a staircase about 7 feet wide to allow enough room for emergency evacuation.

With the framework finally complete, we started laying plywood sub-roadbed. It was quite a sight to look up from the third floor to the fourth and see towering steel framing above. The lowest track in this section, in the city of Tessin, is about 18" above the third floor. At the other extreme, the top of the highest mountain, the Matterhorn, is at 21'-4". In between is a maze of track and streets.

Handlaid turnouts

We use track made by Peco, Tillig, Bemo, and Roco. Since Switzerland has both narrow gauge and dual gauge track, we wanted to incorporate this, too. However, the dual-gauge turnouts on the market didn't seem reliable enough for a display layout, so we built our own turnouts and crossings. So far, our scratchbuilt turnouts have surpassed more than 50,000 cycles and still work flawlessly.

All track is embedded in extruded-foam roadbed, both to reduce noise and speed tracklaying. Only the staging



yards are laid on cork. The steepest grade on the main lines is 2.5 percent, and the cog railway branch line climbs at 16 percent. The new section has 1¾ actual miles of main line and another half mile of branch lines.

Control and wiring

Our layout is run by Digital Command Control with Railware control software. Previously, 27 computers controlled train traffic; the Swiss section added another five. The computers are networked under Windows XP Pro and operated from a central control stand.



Passengers wait on the platforms to board passenger trains at the station in Tessin, Switzerland. This southern province, which borders Italy, is called "Ticino" in Italian. This section will connect to a future exhibit modeling Italy.

Since many trains are pulled by more than one locomotive, we wired the layout with heavier wire than would be used on the average home layout. The track bus is made of 4mm-diameter wire (about 6AWG), with track feeders no thinner than 2.5mm (10AWG). So far, there are some 18 miles of wiring under the layout.

We also had to install a lot of new wiring for lighting on the layout. Every building on the layout is illuminated with light-emitting diodes, and LEDs are also used in thousands of streetlights, beacons, and decorative lights. What's more, every vehicle on the layout has working headlights and tail lights that come on automatically at night. Lighting on the layout is computer controlled, with the sky dimming from day to twilight to night and back again in 15 minutes' time.

The Swiss section also uses more than 600 turnouts and more than 1,000 occupancy detectors, all of which had to be wired and tested.

Scenery

We concentrated on three provinces of Switzerland. On the highest portion is Graubunden, with chalets, mountain scenery, and a town named St. Max, built to resemble St. Moritz. We couldn't use the real town's name, since the town holds a copyright on it, so we took the name "St. Max" from the well-

known German children's tale "Max und Moritz."

Another highlight in this region is the Hammetschwandlift. At 501 feet, the prototype is Europe's highest open-air elevator, capable of moving 12 people at a time. Our model is no less impressive, and was built entirely of brass following the original manufacturer's drawings. It stands 5'-3" tall and can move eight Wunderlanders up the steep mountainside at a time. The mechanism is hidden inside the mountain.

The lower part on the third floor represents the provinces of Wallis ("Valais" in Italian) and Tessin (or "Ticino"), which border Italy and gives us an opportunity to expand into that area later on. In Wallis, the outstanding attraction is the Matterhorn. More than 2,200 pounds of plaster were used in the mountain walls. Unlike the real Matterhorn, Wunderland inhabitants may travel to the summit via cog railway. And if you look very close at night, you might even see some mountain climbers waving their lanterns.

Now on ModelRailroader.com

Want to see more of this spectacular layout? Then watch this online video, featuring stunning aerial views. You'll find it in the online extras box at www.ModelRailroader.com.



► The layout at a glance

Name: Miniatur Wunderland

Scale: HO (1:87.1)

Size: approximately 9,600 square feet over 7 rooms

Prototype: freelanced

Locale: Germany, America, Scandinavia, Austria, and Switzerland

Era: modern

Style: exhibit

Mainline run: approximately 29,500 feet overall; 9,500 feet in Switzerland area

Maximum grade: 2½ percent (16 percent on cogwheel line)

Benchwork: Welded steel tubing in Switzerland area; open-grid wood elsewhere

Height: two stories

Roadbed: pre-ballasted extruded-foam roadbed on plywood (cork on plywood in hidden areas)

Track: code 100, 83, and 70 flextrack with some handlaid turnouts

Scenery: plaster over screen wire

Backdrop: painted walls

Control: Railware Digital Command Control software on 33 networked computers

An open-air concert by Swiss techno-pop musician DJ BoBo has attracted more than 21,000 HO scale fans to the Tessin area. The push of a button plays DJ BoBo's song "Celebration" and animates dancers on stage. This scene took more than three months to build and populate with figures.

Tessin isn't as rugged as the mountain area. The main focus here is on an ancient fortress we named Montibella, where a medieval feast is under way. The best place to appreciate this scene is the balcony of the fortress, but unfortunately, the lord and his lady already occupy it. Close by the fortress is a small ruin that is unique in the Wunderland, in that the entire structure was molded in plaster. Nearby scenes include a medieval market, archers, falconers, and more.

Another highlight in this region is a more modern form of recreation. An open-air concert featuring DJ BoBo, a famous Swiss techno-pop artist, has attracted more than 21,000 fans. Next to the stage is a large campground. It took more than three months to build and populate this area.

The future

So far, 700 houses and bridges, 1,000 vehicles, 50,000 trees, and 4.4 tons of plaster have gone into modeling Switzerland. As for the trains, we've used 1.8 miles of track, 600 turnouts, 300 signals, 3,500 cars, and 200 locomotives. The construction time was 25 months.

At Miniatur Wunderland, we don't know the meaning of the word "finished." We have expansions planned for well into 2020, when we will build a pedestrian bridge over the canal separating the two buildings of the Speicherstadt warehouse complex. Our preliminary plans for this building call for areas modeling France, Italy, Africa, Asia, and an "underground" theme featuring subways and maybe mining.

We may even consider relocating our American section across the canal, as there would be a lot more room for it there. This would be a special treat for me, since I'm a fan of American railroading. **MR**

Erhard Baltrusch is a software developer from Hamburg, Germany, who was one of the initial 15 model railroaders hired to build the initial sections of the Miniatur Wunderland. When he's not working on the massive HO scale display layout, he builds N scale modules at home, modeling the Baltimore & Ohio. His previous articles on Miniatur Wunderland have appeared in the February 2004 and February 2006 issues of Model Railroader.

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Once in awhile a short circuit or other DCC problem can interrupt operation on even the most reliable model railroad. Knowing how to identify these problems and correct them quickly is a useful skill you can learn.

Five steps to troubleshoot a DCC layout

How to help you find, correct, and prevent short circuits and other electrical problems on your model railroad

By David Popp
Photos by the author

One of the most frustrating things that can befall a model railroad is an intermittent electrical problem. At *Model Railroader* I get reader letters from time to time that basically say, "my Digital Command Control-equipped layout can be running fine one moment, and then all my trains stop the next. What's the problem?"

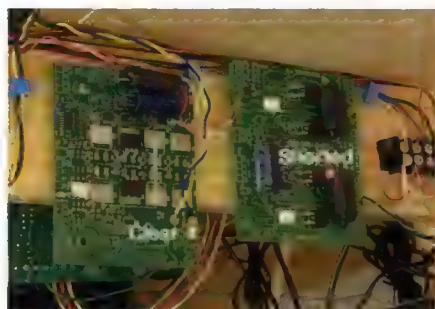
In most cases, it's a short circuit of some kind that is shutting down the DCC system. While even the most reliable model railroad will have an occasional short-circuit problem, there are ways to prepare for, if not prevent, most of them. Here are five basic steps you can use to help you troubleshoot short circuits and other issues on your DCC layout. The steps are arranged so that they deal with the most common and easily fixed problems first.

To show you how it works, let's assume you've been running your layout for a bit when all of a sudden your train comes to a dead stop.

Step 1 Identify that the problem is really a short circuit

Even though all DCC systems have some sort of circuit breaker built into them, typically those breakers are there to protect the system. For that reason, it's a good idea to add one or more DCC circuit breakers to your layout for diagnostic purposes. Though some breakers come with audio alert circuits (or at least the option to add them), most all DCC circuit breakers will have LEDs (light-emitting diodes) that indicate when they are functioning properly and when a short circuit is present, as shown in the left-hand photo.

If you don't have one or more circuit breakers on your layout and you have a lot of problems with shorts, you should divide your layout into power districts (electrically isolated zones of track), installing a circuit breaker on each district.



Most circuit breakers shown when there's a short circuit. These from DCC Specialties use LEDs. The breaker on the left shows all clear. The one on the right indicates a short.



Trains can stop running for reasons other than shorts. In particular, a locomotive can stall simply because of dirty wheels. A quick visual inspection may be all it takes to find the problem.



Checking that the rails have power is an often overlooked step. This amp meter (specifically designed to measure the output of a DCC system) shows that this track does have power.

Step 2 If it is a short, check the trains and turnouts

After you've identified that there really is a short circuit, one of the first things you should check is whether you've got a turnout problem. Look to see if it's something simple, such as a locomotive or car that has run through a turnout set against it, as shown in the left-hand photo. This is a common cause for tripping a circuit breaker, and it's easily corrected.

Derailments are another common short circuit maker. Look for a car or locomotive with metal wheelsets that may have derailed across a turnout. See the middle photo.

If a particular turnout seems to be a repeat offender for shorts, check its rails with a track gauge. (Turn off your DCC system before you do this.) If the track checks out, check the gauge of the wheelsets of the cars or locomotives that seem to cause the short circuit. All it takes is one metal wheel to bridge the gap between two rails of opposite polarities for a split second to trip a circuit breaker. Correct the car, locomotive, or turnout before putting it back into service. (For more on DCC and turnouts, see DCC Corner on page 76.)



One of the easiest things to check for is a locomotive that has run against a closed turnout. The RS-1 shown here has just inched past the frog.



A car with metal wheelsets can cause a short just as easily as a locomotive, especially if the car has derailed over a turnout, such as the hoppers above.



Out of gauge rails, wheelsets, or both are a common problems with short circuits and turnouts. You can check them quickly with a standards gauge.

Step 3 If it's not the turnouts and trains, look for metal objects on the rails

In addition to locomotives and derailed cars, other causes can lead to short circuits. Basically, any metal object that bridges two rails will cause a short. The next step is to walk the layout and look for a tool that may have been set on the track, as shown in the left-hand photo.

Small metal detail parts can also cause trouble, particularly when they fall off a car and wedge themselves between the rails. Look for metal parts that may have come off of a piece of equipment, such as a wire brake pipe, as shown in

the middle photo. These small details can cause shorts, sometimes only when a car or locomotive rolls over the top of them and applies just enough pressure to complete the circuit, making them very difficult to find.

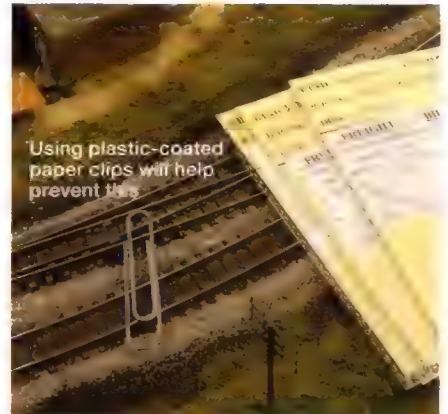
Your friends can also cause short circuits. Don't allow them to set any objects on the layout, particularly during an operating session. Anything metal, such as a soda can, a paper clip, or a pen with a metal clip will cause a short just as easily as anything else if left on the rails.



Any metal object can cause a short circuit. Tools, such as screwdrivers, hobby knives, metal track gauges, and files, are notorious offenders.



Something as simple as a small wire detail part can cause an intermittent short circuit, which can be very hard to detect and locate.



The phrase "operator error" can come into play as well. Pens, paper clips, and soda cans can easily cause short circuits if left on the rails.

Step 4 If it's not a short circuit, check the DCC system

It may seem obvious, but a lot of times people will overlook the fact that the problem may be that the DCC system has shut down. If you're running a lot of trains or had your system on for a long time, the system's booster may have overheated and switched off. I had that happen to me once during one of my operating sessions because the booster couldn't get enough cool air. (In that case, removing the faceplate and setting a small fan in front of the booster did the trick in the short term.)

If the booster has overheated, you're probably running too many trains at the same time for it to handle the current draw. Once the booster has cooled and reset, you can test your layout's current draw by connecting a RRAmpMeter between

the railroad and your booster (as shown in the middle) and then running some trains. The draw current is measured in amps. If your layout is drawing close to or more than the current rating of your booster, you'll need to consider running fewer trains or dividing your layout into power districts and adding one or more boosters to correct the problem.

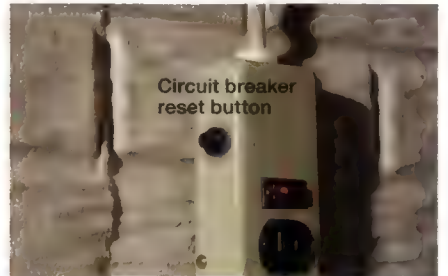
If the system has turned off and won't reset itself after about five minutes, check the power supply and any other connection that provides power to your DCC system, such as a power strip. The fuse may have blown in any of these devices (some power strips also have their own circuit breakers), causing an interruption. Also, it's always possible that the DCC system could have simply come unplugged.



If your circuit breakers don't give you any indication at all (or you don't have any circuit breakers), check to make sure that your DCC system is still getting power and operating.



If you have problems with your DCC system's booster, clip an amp meter in line between your DCC system and the power bus. Then run some trains and check the current load.



Many layout owners use one or more power strips. These have their own fuses or circuit breakers, so check them if your DCC system has shut down and won't reset.

Step 5 If anything else fails, check the wiring connections

When all else fails, check your electrical connections. This is the most time-consuming task because, to be thorough, you must methodically work your way from one end of the layout to the other.

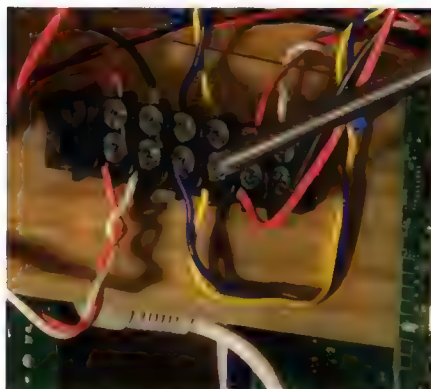
Big offenders of intermittent power loss can be screw terminal strips. I once spent two days looking for an intermittent fault in a large layout control panel I'd built. The problem turned out to be a single screw terminal that wasn't tightened properly. If you use terminal strips, make sure that the wires are seated correctly under the screw heads, as shown in the left-hand photo. If you use crimp-on spade connectors, make sure the wire hasn't come loose from the crimp connector.

Another important electrical connection to check is where the rail feeder wires join the power bus. You may have one or more broken or loose solder joints, causing a loss of power. Also, in places where wires of opposite polarity are run close together, a loose wire or a parallel feeder connection may be touching the bus of the opposite polarity, causing a short. See the middle photo.

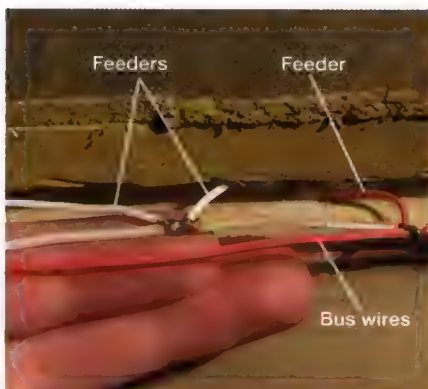
Electrical connections also extend to where feeders are soldered to the rails. However, if you're having trouble because of a broken track feeder, most often it will affect only one small piece of the railroad and not all of it. Also, because it's an open circuit, the loose feeder will simply cause a dead spot in the track and not register as a short.

If all else fails and you still having electrical problems of some kind, try disconnecting all the track power buses from your DCC system. Then, reconnect the buses one at a time until you find the one that's causing trouble. Once you do, you'll need to make a thorough examination of the wiring and trackwork on that section of the layout before returning the railroad to operating status.

Electrical problems can cause headaches on any railroad, DC and DCC alike. However, such "gremlins" are easy to fix if you work methodically through the problem. And once you know what to look for, in most cases you can prevent trouble before it occurs, which gives you more time to enjoy running your trains. **MR**



When checking screw terminal connections, make sure each screw is tight and that the wires are seated properly in the terminal.



Loose or broken solder joints can also be a source of trouble. Also, look carefully for short circuits at locations where exposed bus wires run parallel.



A feeder wire that has broken free and makes intermittent contact can also cause trouble, particularly in high-traffic areas, such as this yard.

Where to make power districts

When I originally built my N scale Naugatuck Valley RR, I didn't immediately split the layout into power districts. Instead, I operated the railroad for a couple months first to see where the traffic would be heaviest, then planned accordingly.

At the moment, my railroad is divided into four power districts, using DCC Specialties Power Shield circuit breakers. As shown in the illustration, the four zones are staging (purple), the main line to Waterbury (blue), Waterbury yard and industrial district (red), and the branch north to Winsted (green). During a typical operating session there's almost always one train running in the red, blue, and green zones. — D.P.

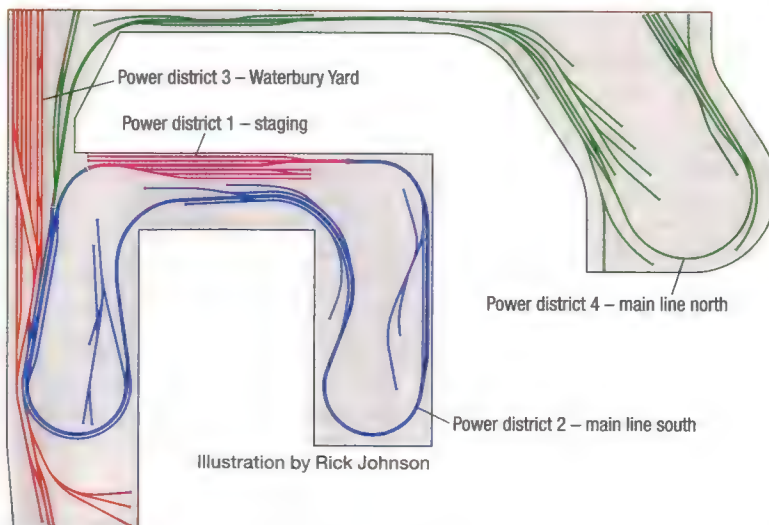


Illustration by Rick Johnson

Modeler's guide to **TRANSITION-ERA GONDOLAS**



Several gondolas populate East Yard on Bill Darnaby's Cleveland, Indianapolis, Cincinnati & St. Louis (Maumee Route) HO scale railroad. Gondolas add visual and operational interest to a layout. Bill Darnaby photo

Learn all about these versatile freight cars

By Tony Koester

Photos by Jim Forbes except where noted

Gondolas are the Rodney Dangerfields of a freight car fleet. They get no respect. It's not long before a shiny new gondola has dented, gouged, and bulging sides, thanks to scrap steel and other heavy, rigid loads dropped unceremoniously into them from heights that would flatten a heavy-duty pickup truck. Gondolas are also the last in line for trips through the car-repair and paint shops.

In this article I'll give you an overview of different types of gondolas and their uses from the late steam era through the steam-to-diesel transition era in the 1950s. You'll also find a list of

many readily available gondola models in N, HO, S, and O scales for that time period on page 57.

Gondola development

The first gondolas were flatcars with wood sides added so they could carry loads such as coal, gravel, sand, pipe, and any other lading that would easily fall off the deck of a flatcar. The prototype for the HO_{N3} model in **fig. 1** is a gondola that first served the Denver & Rio Grande Western Ry. as a flatcar.

The United States Railway Administration (USRA) designed a composite (steel frame with wood sides and floor) gondola, shown in **fig. 2**, as well as all-steel gondolas that stand as milestones in the transition from wood to steel freight cars. Most early designs like the model in **fig. 3** had deep fish-belly center sills. These sills disappeared with the advent of steel sides that had the dual role of containing the load and supporting the car.

In 1936, the Pennsylvania RR introduced a 52'-6" mill gondola as PRR class G27. Through 1939, the Pennsy

built a total of 4,500 G27 gondolas. Greenville and Bethlehem also made mill gondolas of a design very similar to the G27.

Sunshine Models produced an HO resin kit of the G27, available with either Dreadnaught or welded tray ends and either riveted or welded underframes and floors.

Tangent Scale Models just released a ready-to-run HO PRR class G31 gondola. Similar to previous PRR gondola classes, the G31 and its subclasses had an inside length of 52'-6" and featured welded steel construction. The Pennsy purchased 11,600 gondolas that used this body style from multiple builders.

Eastern Seaboard Models makes an N scale model of the 65'-6" PRR class G26 mill gondola, as shown in **fig. 4**. The long gondolas were noticeably narrower than other freight cars so they could maneuver through the tight confines and sharp curves of steel mills. These cars were also free of interior bracing and had drop ends.

During World War II, a shortage of steel plate led to the development of the

Additional reading

Check the online magazine index at www.ModelRailroader.com for a list of articles on modeling gondolas. You may also find the following books of interest. – T.K.

American Car & Foundry by Edward S. Kaminski (Signature Press, 1999)

Pullman-Standard Freight Cars, 1900–1960 by Edward S. Kaminski (Signature Press, 2007)

The Postwar Freight Car Fleet by Larry Kline and Ted Culotta (published by the National Model Railroad Association)

Era-appropriate editions of the *Car Builder's Cyclopedia* (published by Simmons-Boardman)

Various issues of *Railway Prototype Cyclopedia* (Edwin D. Hawkins, RP CYC Publishing Co.)

Ted Culotta's "Essential Freight Cars" series in *Railroad Model Craftsman* magazine

70-ton "war-emergency" gondola, like the model in **fig. 5** on page 54, which had fish-belly Pratt truss sides with wood planks. After the war, many railroads rebuilt the cars with steel sides.

Gondola classification

Gondolas aren't easily identified by their physical characteristics, unlike other steam- and transition-era freight cars, such as the 1937 Association of American Railroads [AAR] boxcar or the American Car & Foundry Type 21 tank car.

Pullman-Standard's PS-5 gondola series signified nothing more than a proprietary design for any gondola the company built, regardless of the car's build date, physical size, or capacity. Even the term "mill gondola" can describe a steel gondola from about 50 to 65 feet.

Gondolas are better defined by purpose, and the AAR class G categories, ranging from GA through GW, offer a



Fig. 1 High-side composite gondola. This Blackstone Models HOn3 gondola depicts a prototype that ran for decades on the Denver & Rio Grande Western. These 1000-series gondolas were rebuilt from flatcars.



Fig. 2 USRA composite gondola. This InterMountain HO car represents a typical USRA composite gondola. The steel parts are molded plastic, but the model's wood sides and floor replicate prototype materials. The less-than-carload-lot (LCL) containers are Walther's models. Jerry Glow model, Tony Koester photo



Fig. 3 Fish-belly center sills. Modeler Jim Six modified an Ertl HO scale 42-foot gondola with a fish-belly center sill to backdate the car to model a specific Atlantic Coast Line prototype. Jim Six photo



Fig. 4 PRR G26 mill gondola. Mill gondolas, like the 65'-6" prototype for this N scale car from Eastern Seaboard Models, were noticeably narrower than other freight cars. This helped the gondolas negotiate the tight confines of steel mills.

Association of American Railroads gondola classes

The following list of Association of American Railroads gondola classes is from the *Simmering-Boardman 1953 Car Builder's Cyclopaedia*. - T.K.

GA	An open-top car having fixed sides and ends and a drop bottom consisting of doors hinged crosswise to dump the lading between the rails. This type of car comes in handy when rock, gravel, or cinder ballast is being dumped.
GB	The plain-vanilla gondola. It has an open top and fixed sides with a solid bottom. The ends may be rigidly attached or may be dropped down to load long cargo such as pipe or rails. The AAR definition specifically cites the GB as "suitable for mill trade," the only class so designated.
GD	An open-top car with fixed or drop ends and a solid bottom, equipped with side doors for dumping. A typical use for such cars is coal.
GE	Fixed sides and drop ends plus drop bottoms having doors hinged crosswise to dump the load between the rails, as for track ballasting.
GH	These cars have fixed sides and drop ends, plus a drop bottom that's hinged along the center sill to deposit the load outside of the rails. The GH is commonly used to unload ballast.
GRA	A compromise between an open hopper and a gondola, with fixed sides and ends as well as one or more hoppers with drop-bottom doors that permit the load to be dumped outside of the rails.
GS	Fixed sides and ends and, like the GH, drop bottom with the doors hinged along the center sill to drop the load outside the rails.
GT	High fixed sides and ends for use with a rotary dumper.
GW	Well cars, which allow high loads to be carried lower in one or more depressions in the floor. They often have suffixes: GWS for permanent racks that accommodate special loads; GWC for cars equipped with coke racks; and GWR for cars equipped with a roof or covers to protect the load.

convenient framework to help us understand the different ways that railroads used gondolas. See "Association of American Railroads gondola classes" listed above.



Fig. 5 War-emergency gondola. Increased freight traffic and shortages of steel plate led to the development of the composite "war-emergency" gondola during World War II. This HO model is distributed by InterMountain (Tichy tooling).



Fig. 6 Steel girder loads. Gondolas were often built to handle standard lengths of structural steel. A 50-foot deck girder span fits readily into a 52-foot gondola. Jerry Glow built this Proto 2000 kit replacing grab irons with ladders. The bridge span is from a Micro-Engineering kit. Tony Koester photo



Fig. 7 General Service (GS) gondolas. Red Caboose makes this model of an AAR class GS gondola. Equipped with bottom doors, these cars carried loads as diverse as coal, crushed stone, beets, rails, pipe, and machinery.



Fig. 8 Caswell class GS gondola. This InterMountain HO model depicts one of the more than 8,000 Caswell gondolas that ran on the Atchison, Topeka & Santa Fe Ry. Caswell referred to the geared mechanism that operated the bottom doors.

Gondolas vs. hoppers

Some gondolas had drop bottoms for unloading ballast, sugar beets, and other loose commodities. The hopper car was even better suited to bottom

unloading, but the advent of the open hopper didn't reduce the popularity of the gondola for several reasons.

The main reason was the gondola's versatility. You can ship coal or crushed

rock in a gondola, but you can't ship rail or pipe in an open hopper. See "Typical gondola loads" to the right. It's no coincidence that track was bolted together from 39-foot-long rails, which could easily fit inside a 40- or 42-foot gondola. Likewise many bridges were made of 50-foot-long steel girders, which tucked neatly into a 52-foot-long gondola, as demonstrated by the HO model in **fig. 6**. Freight car authority Rick Jesionowski, who worked for an electrical contracting firm in Toledo, reports that the most common lengths of telephone poles, 35 and 45 feet, could fit in 40- or 50-foot gondolas without the need for tie-downs.

Through the 1950s, many Western railroads preferred gondolas to open hoppers. The Atchison, Topeka & Santa Fe Ry. had more gondolas than hoppers. This was due to the gondola's greater utility and the decline of coal in favor of natural gas and oil. Richard Hendrickson, the author of many books on Santa Fe freight cars, notes that the elevated bunkers needed to unload hoppers were rare in the West, and coal traffic was seasonal.

Western railroads like the Santa Fe seldom shipped coal in solid bottom gondolas. Instead, they preferred class GS gondolas with drop bottoms, such as the cars shown in **figs. 7 and 8**. Both ATSF and Southern Pacific had fleets of about 10,000 class GS gondolas. In the 1940s and '50s, Rio Grande and Union Pacific RR moved all of Utah's coal traffic in class GS gondolas. After the 1950s, new GS gondola purchases virtually ceased, but the ATSF, SP, and UP all had substantial fleets of them into the 1960s.

In the first half of the 20th century, it was cheaper for a coal yard to pay a few laborers to shovel coal out of a gondola than to build a concrete unloading pit and buy a conveyor for a hopper. Small engine terminals often employed manual labor instead of building a coal dock or buying a crane with a clamshell as in **fig. 9** on the next page. The scene in **fig. 10** shows the more labor-intensive approach. Shoveling coal out of a flat-floored gondola was much easier and safer than doing the same task on the sloped sides of a hopper.

Some eastern railroads, such as the Norfolk & Western Ry. and the Virginian Ry., shipped coal to ports in high-capacity "battleship" gondolas, such as the car in **fig. 11**. The massive gondolas rode on six-wheel trucks. The lack of floor openings wasn't a factor, since these railroads used dockside rotary dumpers. Turning either a gondola or a hopper upside down to unload it was

Typical gondola loads

Clark Propst, who models the Minneapolis & St. Louis in HO, obtained a copy of a list of gondola loads in the late 1940s through the '50s prepared by M&StL mechanical superintendent Bill Landmesser and transcribed by Gene Green. Here's a sample of gondolas by reporting marks, road number, AAR type, and lading. — T.K.

Railroad	Road number	AAR class	Lading
B&LE	36601	GB	railroad ties
B&O	253772	GB	billets
B&O	450749	GB	steel
C&NW	71655	GB	rip-rap
CGW	1163	GB	rock
D&H	13594	GB	brick
EJ&E	33976	GB	steel roofing
GN	75795	GS	road scraper blades
GN	74756	GS	seed
L&N	49448	GB	coal
MILW	70980	GB	iron
MILW	86176	GS	auto frames
M&StL	30075	GS	logs
M&StL	30085	GS	company sand
M&StL	30201	GS	scrap wheels
M&StL	30315	GS	sugar beets
M&StL	30449	GS	refuse
MP	11162	GB	pipe
MP	12133	GB	wheat
MP	12535	GB	corn
MP	14991	GB	scrap
MP	22276	GB	coke
NP	59197	GB	pig iron
NYC	726160	GB	rafters
NYC	603003	GB	rail
PRR	383003	GB	tubes
PRR	613685	GB	aluminum
PRR	613695	GB	Allison Insulation
PRR	362199	GB	roofing
PRR	361262	GB	company material
PM	18701	GB	sheet metal
SAL	96260	GB	machinery
SOU	117720	GB	lumber
UP	22528	GB	ore
URR	6864	GB	moldings
W&LE	74740	GB	flour

faster than individually unlocking and opening hopper doors, and then waiting for the hopper to empty.

Spotting features

Along with the list of some representative gondola models on page 57, the following spotting features will help you choose and detail a model to match a specific prototype.

Length: Standard gondola lengths are around 40, 50, 52, and 65 feet. The interior dimensions of some gondolas often match standard sizes of steel structural members.

Ends: Gondolas that hauled coal, gravel, beets, sand, or stone had fixed ends. Mill gondolas had drop ends. These ends could be folded inward to accommodate structural steel, pipes,



Fig. 9 Unloading cranes. Clamshell buckets on cranes were often used to unload gondolas at busy yards, such as in this scene on the Chicago & Northwestern in the mid-1940s. Chicago & Northwestern Historical Society collection



Fig. 10 Shoveling coal. An engine watchman shovels coal from a gondola into the bunker of a Santa Fe 2-6-2 at Burlingame, Kan. Small engine terminals often relied on manual labor to unload coal, rather than building a coal dock. Kenneth Goebel photo. Jared Harper collection



Fig. 11 AAR class GT "battleship" gondolas. The Norfolk & Western Ry. and the Virginian Ry. had a fleet of high-capacity "battleship" gondolas like this one at Victoria, Va., in 1950. Since the cars were unloaded with rotary dumpers, there was no need for bottom-discharge doors or hopper gates. H.W. Pontin photo. Kalmbach Publishing Co. collection

poles, or timbers that exceeded the gondola's length to be extended over an idler flat car at one or both ends.

Floor: Car shops built gondolas with wood, steel, or "nailable" steel floors. The floor could be solid, as in the case of a mill gondola, or equipped with drop-bottom unloading hatches that opened downward, as in the case of a class GS gondola.

Sides: Early steel cars, such as the USRA gondola, had fish-belly center sills that tapered to a visibly thicker cross-section between the trucks. Later gondolas had thicker steel sides to support the car, so straight center sills became the norm.

Exterior posts: One of the most obvious spotting features is the number of exterior posts along the sides. Also note whether the posts end flush with

the bottom of the sides or stop at the floor line.

Brake wheel or lever: The brake wheel or lever is usually mounted on the end of a fixed-end gondola. On drop-end gondolas, the brake wheel or lever is mounted on the side or made to fold clear of the open end.

Trucks: Within limits (say, 50 to 70 tons), the tonnage rating of a freight car can be increased simply by increasing the size of the weight-bearing journal surfaces without changing the basic style of truck sideframe. However, it's worth taking a careful look at the appearance of the prototype sideframe and trying to find a good model of it. (Note that looking for a model of a "Bettendorf truck" isn't sufficiently specific, as this company, based in Bettendorf, Iowa, made several types of

freight and passenger car trucks. Author Richard Hendrickson also points out that although Bettendorf first developed trucks with journal boxes cast integral to the sideframe, many other freight-car builders quickly adopted this design feature.)

Adding texture

More than any other type of freight car, the gondola prominently shows its battle scars. A pristine, new gondola won't stay that way for long. Gondola models are prime candidates for heavy-duty weathering.

Gondola loads are usually visible and eye-catching, which makes it easy for your operating crews to spot loaded cars at the correct industries.

Don't disregard the lowly gondola on your transition-era layout. These

Gondola models

The following list is of some readily available gondola models in N, HO, S, and O scales. The list includes kits and ready-to-run models. – T.K.

Model manufacturer	Description	Inside length	Scale	Model manufacturer	Description	Inside length	Scale
Accurail	AAR steel ca. 1941	41'-6"	HO	Micro-Trains	Composite fish-belly sides, drop ends	50'-0"	N
Arnold Rivarossi	Steel "type E"	40'-0"	N	Micro-Trains	Composite straight sides, drop ends	50'-0"	N
Athearn	Flat or peaked ends	40'-0"	HO	Model Die Casting (Athearn)	C&O 36000-series with peaked ends	40'-0"	HO
Athearn	With or without cover	50'-0"	HO	Model Power	Steel	50'-0"	N
Athearn	Mill	52'-0"	HO	Model Power	Steel	40'-0"	HO
Athearn	Mill	65'-0"	HO	P-B-L	High-side gondola	32'-0"	Sn3
Atlas	Steel	42'-0"	N	P-B-L	Drop bottom	32'-0"	Sn3
Bachmann	Steel	40'-0"	HO	Red Ball (Wabash Valley)	Mill	65'-0"	HO
Bachmann	Steel	40'-0"	N	Red Caboose	USRA composite drop-bottom	40'-0"	N
Bachmann	Wood	32'-0"	On ¹ / ₂	Red Caboose	General Service drop-bottom	41'-0"	HO
Blackstone	D&RGW wood	32'-0"	HO ⁿ 3	San Juan Car Co.	Wood for pipe loading	30'-10"	On2-1/2 and On3
Bowser	General service	40'-0"	HO	Sunshine	L&N and SOU drop-bottom	40'-0"	HO
Bowser	PRR GS	40'-0"	HO	Sunshine Models	Various limited-run resin kits		HO
Dimi Trains	Sugar beet	40'-0"	N	Tangent	PRR G31 mill	52'-6"	HO
Dimi Trains	Drop-bottom	40'-0"	N	Tichy	ACL flat with wood sides	40'-0"	HO
Durango Press	D&RGW wood high-side	32'-0"	HO ⁿ 3	Tichy	War-emergency composite	52'-6"	HO
Eastern Seaboard Models	PRR G26 mill	65'-0"	N	Trainworx	Drop-bottom	40'-0"	N
E&B Valley	PRR G26 mill	65'-0"	HO	Ulrich cast metal (Walthers)	War-emergency composite	52'-6"	HO
Ertl	Low-side gondola	42'-0"	HO	Walthers	Composite	40'-0"	N
Funaro and Camerlengo	NYC 9-panel	40'-0"	S	Walthers	USRA steel	46'-0"	HO
Funaro and Camerlengo	USRA NYC rebuild	40'-0"	O	Proto 1000 from Walthers	USRA 50-ton drop-bottom composite	40'-0"	HO
InterMountain	USRA NYC rebuild	40'-0"	HO	Walthers	Mill	65'-0"	HO
InterMountain	USRA composite drop-bottom	40'-0"	N and HO	Proto 2000 from Walthers	Greenville-design mill	52'-6"	HO
InterMountain	Caswell composite	41'-0"	HO	Westerfield	Various resin kits ranging from 36-ft. wood coal gondolas to N&W "battleship" gondolas		HO
InterMountain	General service	46'-0"	N				
InterMountain	Wood-chip	41'-6"	N				
InterMountain	USRA composite drop-bottom	41'-6"	O				
Mantua	Steel	40'-0"	HO				
Micro-Trains	Composite	33'-0"	N				
Micro-Trains	Steel fish-belly or straight sides, drop ends	50'-0"	N				

versatile cars are visually interesting and can be used to model a variety of operations. Gondolas add "texture" to your trains and railroad. **MR**

I'd like to thank freight-car authorities Ray Breyer, Richard Hendrickson, Frank Hodina, Andy Sperandio, and Tony Thompson for their help. Any misinterpretations of data are my own.

Read more articles on transition-era freight cars

I've written two previous articles about specific types of transition-era freight cars, which you may find useful. Both articles describe common spotting features and include a list of representative scale models. "Modeler's guide to steel boxcars" and "Modeler's guide to transition-era tank cars" appeared in the May 2006 and December 2008 issues of *Model Railroader*. – T.K.

1. Adding operations to your layout is easier than you think. Brooks Stover explains the operating scheme he developed for his S scale Buffalo Creek & Gauley. In this photo, mine run No. 1 passes westbound passenger train No. 3 at Widen, W.Va.



Adding operations to a model railroad

How to use a straightline graph and conductor's orders to develop and manage operating sessions

By Brooks Stover • Photos by the author



In addition, a five-car log train made one round trip from the sawmill to the woods, and a Mack rail bus (shown on page 62) made two round trips. That was it. How was I going to make a challenging three-hour operating session for a 6- to 8-member crew with what seemed like so little action?

Layout design

Before proceeding, I should provide some details on the configuration of the track plan shown on page 61. It's moderately sized, filling a large part of a 25 x 44-foot room. Since I model in S scale, and because I maintained a minimum aisle width of four feet and a low track-to-scenery ratio, the main line is only 110 feet.

Along the main there are five small towns, just like on the real railroad, and 18 switching locations. There's 40 feet of track on the logging branch, with nine switching locations.

I also modeled the BC&G's interchange with the B&O. That railroad serves four industries and has eight car spots, bringing the total number of switching locations to 35.

There are passing sidings at each town to allow runarounds, but with a four-car capacity, they're short. Longer passing sidings are located at the B&O interchange and the Rich Run Mine in Widen, and these hold 11 cars.

The car-card trial

I first tried a car-card-and-waybill routing system. However, because of the limited siding capacity, I found it necessary to manually select the destinations for each car. My goal was to avoid having too many cars collect at one location or have trains longer than the passing sidings.

I also tried a couple of simple timetables to control train meets, but variations in the time it took to complete switching assignments, especially at the mine, made it difficult for crews to stay on schedule. Clearly I needed a better way to schedule trains and a simple way to communicate the schedule, consistent with the character of a short line.

Train schedule

I developed a schedule of trains for the BC&G using the straightline graph shown in **fig. 1** on the next page. Time is depicted on the horizontal axis and layout locations on the vertical axis. This technique has been covered extensively in the hobby press, and I couldn't have worked out my operating scheme without it. It may not seem that such a graph, usually associated with larger layouts, was necessary for a fairly simple

I'm fortunate to be a part of a group of modelers who meet regularly for operating sessions. Like many, I've found that the ultimate enjoyment of the hobby comes from bringing model railroads to life with prototypical operating schemes. Within our group are layouts of all sizes, scales, and prototypes. There's also a variety of operating schemes used, from running trains sequentially with car-for-car switching to timetable-and-train-order operation with a fast clock and dispatcher.

As I reached the point of hosting an operating session on my new S scale Buffalo Creek & Gauley, I was faced with developing an operating scheme. I enjoy layouts where there are plenty of

train movements and the crews communicate with the dispatcher via radio. However, I knew this wouldn't be possible, or appropriate, for my circa-1957 backwoods West Virginia short line.

For starters, the BC&G's main line was only 18.6 miles long. In the period I model, the line operated one mine run a day, picking up empty coal hoppers from an interchange with the Baltimore & Ohio RR (B&O) at one end of the line and delivering the cars to a coal tipple at the other end of the railroad. After switching out the empties, the train returned to the B&O interchange with loaded coal hoppers. The train also did some local switching on the return trip.

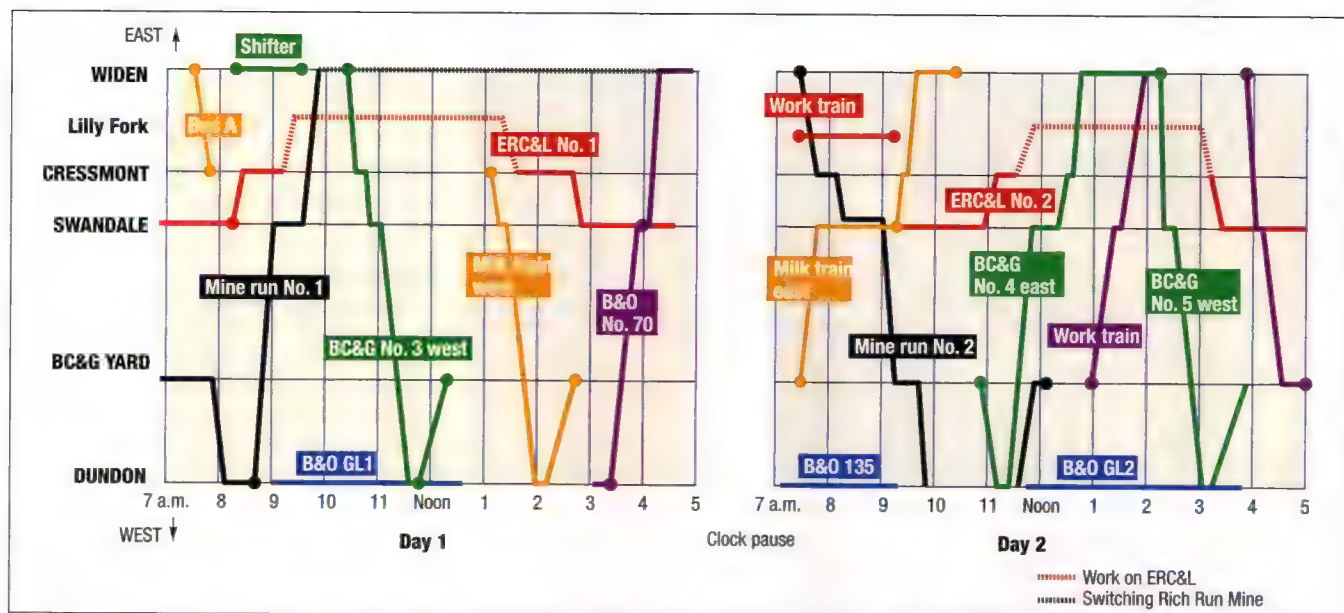


Fig. 1 Straightline graph. This graph shows the relationship between train time and location. Illustration by Rick Johnson

C T Form 204 - Schedule 5 (12-49 1500 JLC)

THE BUFFALO CREEK & GAULEY RAILROAD CO.
Conductor's Orders

Train: BC&G PASSENGER #3 West

Engine No. 4 Engineer Conductor Date Aug 15, 1958

Crew Call: 9:15 am

SUMMARY
- This train makes a WB trip from Widen to Dundon Station where it sets out a B&O car. It then ties up at BC&G Yard.
☆ - 2 MEETS: WIDEN and DUNDON
- Note for ENGINEER: Maximum Speed - 14 mph

Arrive	WIDEN	Depart	10:15 am
<ul style="list-style-type: none"> Train is made up and spotted on Main 2 ☆ Meet BC&G COAL EXTRA #1 arriving at 10:00 am on Main 1 Pull forward to Platform to load passengers before departing 			
Arrive	CRESSMONT	Depart	10:35 am
- Discharge and pick up passengers at Dairy			
Arrive	SWANDALE	Depart	10:50 am
- Discharge and pick up passengers at Passenger Platform adjacent to Swandale Post Office			
Arrive	BC&G YARD	Depart	
- NO STOP. Proceed to Dundon			
Arrive	DUNDON	Depart	11:25 am
<ul style="list-style-type: none"> ☆ B&O GRAFTON LOCAL #1 will have cleared main and loop - Discharge passengers - When departing, back out of station and turn entire train on loop, then... Note: Set out B&O 1443 on Coach Track - Proceed to BC&G Yard 			
Arrive	BC&G YARD	Depart	Termination
<ul style="list-style-type: none"> - Spot BC&G X6 and 16 on Passing Track - Spot engine on Engine House Track 			

Fig. 2 Conductor's orders. Brooks used a Microsoft Excel spreadsheet to create these single-sheet forms. The conductor's orders shown above are for a passenger train, listing meets, setouts, and departure times.

C T Form 204 - Schedule 5 (12-49 1500 JLC)

THE BUFFALO CREEK & GAULEY RAILROAD CO.
Conductor's Orders

SHEET NO. 1 of 2 Train: COAL EXTRA #1

Engine No. 14 Engineer Conductor Date Aug 15, 1958

Crew Call: 7:00 am

SUMMARY
- After departing BC&G Yard and backing to the B&O Interchange at Dundon, this train makes a EB trip to Widen, switching Swandale enroute.
- This train does all required switching at Widen, including making up the WB COAL EXTRA #2.
☆ - 2 MEETS: Both at WIDEN
- Note for Engineer: Maximum speed - 14 mph

FROM	CLASS	INITIAL	NUMBER	LOCATION	Label	9	EMPTY	LOADED
Arrive BC&G YD Depart: 7:30 am								
<ul style="list-style-type: none"> Engine is spotted on RIP Track Service engine with sand and make up train Take water before backing to Dundon. Note: Water plug is on BC&G main. 								
P	B	NYC	437	Deck	ADS			
P	G	BC&G	603	Trk 1	Pipe			
P	Coach	BC&G	17	Pass Trk				
Cars in consist: 2								
Arrive DUNDON Depart: 8:45 am								
<ul style="list-style-type: none"> Pick up all cars on B&O Interchange Track - Confirm cars with list below 								
P	CH	B&O	637	B&O Interchange	E			
P	B	CB&Q	321		E			
P	B	VGN	099		HG			
P	T	UTX	794		O			
P	H(2)	WAM	395 & 804		E			
P	H(3)	B&O	427 thru 203		E			
P	H	WAB	174		E			
P	LH	B&O	082		E			
Cars in consist: 13								
Arrive SWANDALE Depart: 9:45								
- Take water								
S	CH	B&O	637	Passing Trk	E			
S	B	CB&Q	321	Passing Trk	E			
Cars in consist: 11								

Fig. 3. Freight orders. The conductor's orders for freight trains have a switch list. In addition to the car class and reporting marks, the last line includes the number of cars that should be in the consist before it departs each town.

railroad. However, I found the straightline graph to be the only way to visualize where a certain train would be at a specific time.

Though the final graph depicting all the trains looks intimidating, I developed it one train at a time. I first created a schedule for the priority trains,

mine runs Nos. 1 and 2, shown in black on the graph. I developed the schedule by actually running the planned trains over the railroad and carefully recording the time required to complete all movements, including the mine switching (indicated by the black dotted line on the graph at Widen).

To test the validity of the schedule, I had members of my operating crew run the trains. I learned that the time required to switch the mine depended greatly on the skill of the crew.

It took some crews as little as 30 minutes to do the switching. Others took a full hour. This large variation

greatly complicated filling in the rest of the schedule.

My solution was to divide the operating session into two parts, or "days." The break between days serves as a buffer to accommodate the variation in the time required to switch the mine. The first day of the operating session ends when mine run No. 1 has finished its work and the return train, mine run No. 2, is made up and ready to depart. If the mine switching takes extra time during a session, the crews of the other trains can grab a coffee or a rest room break before getting their new assignments and starting the second day. The fact the prototype BC&G coal train made the round trip in one day but takes two on the layout was a compromise I was willing to make for the added benefit of a smoother running session.

With the mine run schedules set, I filled in the remaining time and track with as many trains as reasonable to generate a full operating session that would keep operators busy. In addition to the prototypical log trains and Mack rail bus trips, I introduced work trains and a fictitious, but plausible, BC&G passenger train. I also added a fictional trip to the mine by a B&O gas-electric. Finally, three B&O locals (from staging) switch industries near the interchange. In the end, I wound up with a schedule of 17 trains operating over two days. Four 2-man crews simulate nearly 24 hours of railroading during a three-hour session.

Conductor's orders

The final step was to develop a way to let crews know the schedules for their trains, switching assignments, meets, and special instructions. I like to keep paperwork at a minimum so operators can focus on the sights and sounds of their trains. Besides, the engineer already has his hands full with the throttle, and the conductor has to lay down whatever paper he has to align turnouts and uncouple cars.

I developed the conductor's orders shown in **figs. 2 and 3** using a Microsoft Excel spreadsheet. The forms are loosely based on a real BC&G freight conductor's report form. The 8½" x 11" sheet fits on a standard size clipboard. Hooks on the fascia allow conductors to hang their clipboard but still read the orders.

Each form contains the information a crew needs to run its train. The train name, assigned engine, and crew name appears at the top. See **fig. 3**. Also near the top is the crew call time, the time crew members need to receive their orders, locate their train, and familiarize

►► The layout at a glance

Name: Buffalo Creek & Gauley
Scale: S (1:64)
Size: 25 x 44 feet
Prototype: Buffalo Creek & Gauley
Locale: West Virginia
Period: 1957
Style: linear walkaround
Mainline run: 110 feet
Minimum radius: 32" (visible track), 24" (hidden track)
Minimum turnout: no. 6
Maximum grade: 1½ percent (BC&G), 2 percent (ERC&L)
Benchwork: L girder
Height: 43" to 57"
Roadbed: cork over Homasote on 5/8" plywood
Track: code 148 flextrack
Scenery: grocery bag paper and plaster gauze over cardboard lattice
Backdrop: drywall
Controls: NCE Corp. Digital Command Control



Illustration by Rick Johnson

Buffalo Creek & Gauley RR

S scale (1:64)
 Layout size: 25 x 44 feet
 Scale of plan: 3/4" = 1'-0", 24" grid
 Numbered arrows indicate photo locations

— Buffalo Creek & Gauley RR
 — Elk River Coal & Lumber Co. logging branch
 — Baltimore & Ohio staging tracks



2. Mine run No. 1 is the biggest job on the Buffalo Creek & Gauley. In this photo we see 2-8-0 no. 14 switching the Rich Run Mine at Widen.



3. The conductor's orders for Mack rail bus A call for it to pick up a parcel at the shack at milepost 4. Stops like this were made by the full-size Buffalo Creek & Gauley rail bus, and it adds to the realism of layout operations.

themselves with their assignment and the layout.

Next is the job summary, which includes the towns where meets are scheduled (highlighted by a star so they can't be missed) and the maximum speed for the train as displayed on the cab's liquid-crystal display screen. This information has proven useful, especially for new operators.

Below the job summary, the form is divided into boxes (one for each town that the train will pass through). At the top right corner of each box is the departure time, if designated. No departure times are specified unless

needed to control train movements. Otherwise, the train can depart when its work is done. These departure times are the only data from the straightline graph that the crews see.

Within the box are instructions for each crew. These special instructions include details concerning the time of the meets, what track to hold on, and what train the meet is with.

If required, a detailed switch list is included below the special instructions, as shown in **fig. 3**. Most of the column headings are self-explanatory. Interestingly, the full-size BC&G used its own abbreviations for car classes,

not those developed by Association of American Railroads. For example, the BC&G used B for boxcar, H for hopper, and G for gondola.

The railroad also used its own abbreviations for lading, which I attached to the clipboard for crews to refer to. Each clipboard also has a list of basic whistle signals.

On the last line of the switch list is the total number of cars that should be in the consist before proceeding to the next town. This verifies for the crew that all scheduled switching was accomplished and the correct cars are in the consist.

Developing switch lists

I developed my switch lists by walking the layout, using car cards as a surrogates for actual cars. I laid the cards on the layout and orchestrated manually what would happen during the session. This way I knew each train's length at every stage. It didn't take long to choreograph a session, since not all trains do switching. I recorded the starting positions of all cars so I could use the same set of conductor's orders again in another session by restaging cars to their original positions.

A proven winner

I'm very happy with the schedule that evolved using the straightline graph, and the conductor's order forms have been well received by new and veteran operators alike.

My operating sessions have a laid back atmosphere, but crews have clear instructions on what to do. Operators work from a single sheet of paper that I can use again if I choose to. I also keep a copy of the straightline graph handy for this purpose. Otherwise, I can enjoy watching the BC&G and B&O crews go about their business moving products and people efficiently around a little corner of West Virginia. **MR**

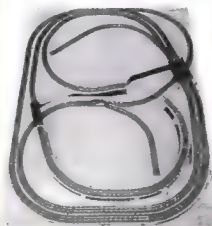
Brooks Stover is a retired automotive design engineer who lives in the Detroit area with his wife, Carol. They have two grown daughters and four grandchildren. You can learn more about the full-size Buffalo Creek & Gauley and see more photos of Brooks' layout on the Internet at buffalocreekandgauley.com.

Now on ModelRailroader.com

Brooks' previous Buffalo Creek & Gauley layout was featured in the December 1993 *Model Railroader*. You can view the article on our Web site, www.ModelRailroader.com.

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Model a Logging camp in a small space

How to build forested terrain, camp structures, and logging railroad equipment

By Jeff Johnston
Photos by the author

Although my HO scale diorama measures just 12" square by 19" tall, it effectively captures the feel of a big-time logging company camp tucked deep in the woods. It's essentially a stand-alone scene that I intend to install on the home layout that my wife Pam and I are building based on Sugar Pine Lumber Co. (SPLCo) operations in 1927.

I specifically used the 12" dimensions because that's the maximum size for the "mini diorama" contest class at the Pacific Model Loggers' Congress convention (www.pacificmodelloggerscongress.com), as well as the Northwest Logging Modelers convention (www.northwest-loggingmodelers.com).

It's a challenge to see how much can be packed into such a small space, but it isn't nearly as tough as trying to fill a substantially larger area. I'll share key techniques you can use to create and enhance a small scene like mine or similar scenes with a bigger footprint.

Structures set the scene

Almost every logging company operating in the 1920s maintained remote work camps in the woods. These camps,

Building a logging railroad can be an extensive endeavor in any scale, so author Jeff Johnston decided to start small. He built this 12" x 12" camp diorama for a contest, and it will eventually be installed on his layout.





Fig. 1 One square foot. In no more than a single square foot, Jeff included a railroad right-of-way, portable cabins, and a materials warehouse that he detailed to represent a portion of the Sugar Pine Lumber Co.'s operations in California.

ranging from simple tents to small "towns" with semi-permanent structures, had the goal of keeping workers conveniently close to the job sites.

In **fig. 1**, you'll see that my scene includes a semi-permanent warehouse, which is fairly elaborate for a logging outfit, along with several portable cabins and a small tool shed on skids. Because they influence the composition of my setting, I started my project by assembling these structures first, even before making the scenery base.

No manufacturer makes kits for SPLCo buildings, so we scratchbuilt or kitbashed many of the structures. However, for my logging camp diorama, I did find three American Model Builders wood Laser Kits with suitable architectural features. As shown in **figs. 2** and **3**, I assembled the no. 114 portable tool and handcar house, no. 706 elevated warehouse, and no. 710 Long-Bell Lumber Co. skid shacks (portable cabins) according to their directions.

The SPLCo began erecting its structures in the early 1920s, so you won't see any battered buildings here. I left the walls of the skid shacks unpainted, though I applied a black wash (1 teaspoon India ink mixed with a pint of rubbing alcohol) to the exterior walls. Additionally, I painted the doors, window, and edge trim with Polly Scale Reefer White with a few drops of Steam Power Black added.

For the skid shacks' roofs I used Evergreen Hill Designs no. EH301 peel-and-stick cedar shingles, which I sealed with a flat finish. I used a couple of brown and gray washes and then drybrushed white highlights to add an appropriate amount of weathering.



Fig. 2 Cabins. The Long-Bell Lumber Co. skid shacks by American Model Builders are appropriate for the 1920s period Jeff models. He stained them with an ink wash and topped the roof with Evergreen Hill Designs peel-and-stick shingles.



Fig. 3 Warehouse. Jeff used scratchbuilding techniques to modify the stained stripwood loading dock of the American Model Builders warehouse kit.

Next, I painted the warehouse and smaller portable tool house with Badger Modellflex no. 16-41 Southern Pacific Armour Yellow – a color that's nearly identical to the yellow the SPLCo

used on its painted structures. I made the roofs of these buildings using strips of tissue paper. I painted the thin paper roofing Polly Scale Tarnished Black, adhered it using white glue, and trimmed



Fig. 4 Contours. To give the Homasote square more contour, Jeff attached additional scraps of Homasote and foam-core board to the base with white glue before covering the landforms with Sculptamold.



Fig. 5 Test placement. Jeff tested the placement of the structures to ensure all the buildings fit into the compact scene in a realistic-looking manner.



Fig. 6 Taking a break. These Woodland Scenics figures are far more relaxed than the other loggers on the diorama. Also note the stacked wood blocks that prop up the skids to keep the shacks level on sloping ground.

► Materials List

American Model Builders LaserKit

114 Portable tool and handcar house
706 Elevated warehouse
710 Long-Bell Lumber Co. skid shacks

Badger Model-Flex Paint

16-41 Southern Pacific
Armour Yellow

Evergreen Hill Designs

EH301 Peel-and-stick cedar shingles

Polly Scale acrylic paint

414110 Steam Power Black
414113 Reefer White
414299 Flat Aluminum

the edges with Steam Power Black to represent tar sealant.

As a slight modification to the warehouse design, I substituted wood post footings for the brick pilings included in the kit. I also assembled the deck from basswood. I later stained it with a black wash. See **fig. 3** on the previous page. Finally, I used an artist's brush to weather the structures with chalk powder and sealed them with an overspray of clear flat finish.

Base construction

To form a firm base for my logging camp, I stacked two pieces of 12"-square Homasote. I laid the track on a diagonal to add interest to my diorama.

I also wanted the terrain to slope up into one corner, so I attached another chunk of Homasote with white glue. For additional contours I added a few scraps of 1/4" foam-core board. As seen in **fig. 4**, I used Sculptamold to blend the base shapes into terrain that included the railroad fill in the left front corner and a gentle upward slope in the back right corner.

After allowing the components to dry, I test-fit several assembled structures directly on the base. You can see the results of one test in **fig. 5**. Although I was confident the structures would fit, I wanted to confirm that I could install the large sugar pine trees without inhibiting sightlines.

I specifically wanted the cabins, located at the rear of the diorama, to look as if they were on small terraces dug into the hill. I planned to support the front of the cabins with stacks of timbers or log segments. This was a common practice in logging camps, which



Fig. 7 Log bunks. Jeff made a mold from his own styrene patterns and cast urethane log bunks. Using cast parts is advantageous when you need more than one of the same piece.

were seldom built on level ground. I used Sculptamold to form the terraces and carefully smoothed away any tool marks left on the surface.

Next, I secured a piece of code 55 HO flextrack to the Homasote using white glue. I brushed brown and gray acrylic paints onto the ties and rails. Because a busy logging line should have track with shiny rails, I used a cloth to wipe the railheads clean.

Forest floor

The soil material and colors I chose are based on photos and visits to the actual site, where I also collected soil samples. Because the diorama dirt came from the actual site, I knew it would look authentic.

To cover the base with scenery, I started by brushing it with brown latex wall paint. I used a spoon to apply the sifted soil to the wet paint along walkways and sifted bark debris nearly everywhere else. I sprayed a light mist of "wet" water (tap water with a few drops of dish soap added) to moisten the ground cover before I applied diluted white glue. After completing the ground covering, I used finely sifted soil to ballast the track.

I secured the camp structures in place with a small amount of white glue, as I wanted to remove them later without causing any structural damage. To serve as supports for the cabin skids, I used chunks of wood cut from pine tree branches and other wood scraps. See **fig. 6**.



Fig. 8 Details. It doesn't always take junky clutter to make a logging scene credible. The crates and barrels are commercial items, and Jeff made the cable bundles from gray thread painted flat aluminum.

Tall timber

Big trees are a vital part of many deep woods logging scenes. My trees are balsa sticks that I carved round, tapered, scraped with a razor saw blade, then colored with brown and gray acrylic artist colors. The foliage is pieces of furnace filter material I cut to shape, pulled loose, and glued to the trunks. A bit of green spray paint and foam texture material helps create the illusion of a branch structure.

I made mounting pins for the trees from 12-gauge copper wire. I cemented the wire into the base of the trunk and then drilled holes into the Homasote base to install the trees.

Dead stumps are frequently seen among growing trees, and my stumps started as carved balsa sticks. I used shades of gray acrylic artist paint along with red and orange paint applied to sections representing rotted wood. I also used sagebrush twigs to represent random branches, broken trunk sections, and other forest debris.

The brush and shrubs are Woodland Scenics poly fiber that I stretched thin, coated with hair spray, and dusted with ground foam.

Finishing details

Though logger figures are available from Preiser, Woodland Scenics, and other suppliers, use of these means that the same people will repeatedly appear on your layout. Consequently, many of the figures I used are modifications of non-logging characters.

To help some figures stand upright, I drilled a .020" hole into one leg and used cyanoacrylate adhesive (CA) to

secure a short brass wire in the hole. I drilled another hole in the base where the figure would stand.

The log car I added to the scene is an accurate model of a Pacific Car & Foundry prototype used by the SPLCo. I started with a Tichy Train Group flat car and added Evergreen styrene to replace side sills in the kit. The log bunks on the deck are urethane castings made from my own styrene patterns and rubber molds. See **fig. 7**.

Loggers needed wood for a variety of projects beyond cutting and producing lumber. I placed lumber scraps elsewhere on the diorama. Additional details include various scrap box finds and cable bundles I made by painting gray thread with Polly Scale Flat Aluminum. See **fig. 8**.

After the paint partly dried, I pulled the thread through my fingers, which forces any little fibers down into the paint and produces a smooth cable. The paint also makes the thread stiffer so it's easier to shape and is less prone to springing loose.

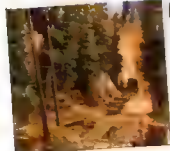
The finished diorama will fit nicely into a prepared location on our new layout. It's fun to build a scene like this, because it doesn't take too much time and provides an opportunity for me to hone the modeling skills I'll use on the rest of our model railroad. **MR**

Jeff Johnston resides in Eugene, Ore., and has been an automotive journalist for 30 years. He and his wife, Pam, also a model railroad enthusiast, are working together on an HO scale layout based on the Sugar Pine Lumber Co./Minarets & Western Ry.

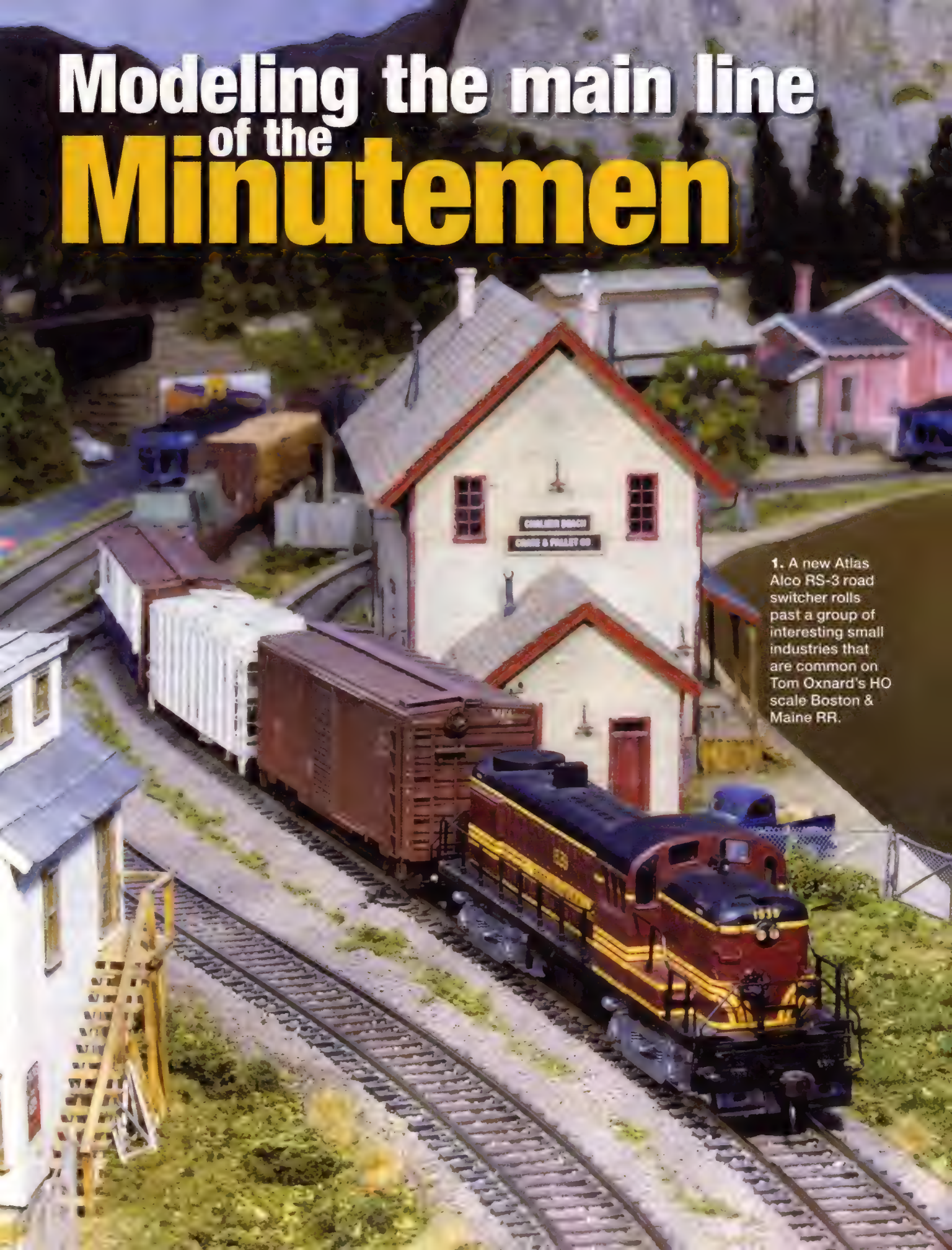
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Modeling the main line of the **Minutemen**

A detailed HO scale model of a train passing a station and small businesses. The train, led by a maroon and yellow Atlas RS-3 road switcher, is pulling several freight cars, including a white one and a brown one. It is moving along a track that runs alongside a yellow station building with a red roof. The station has a sign that reads "CHARLES BRACK" and "CRANE & PALLET CO.". In the background, there are other small buildings, including a pink one, and a blue car. The scene is set in a lush, green environment with trees and hills in the distance.

1. A new Atlas Alco RS-3 road switcher rolls past a group of interesting small industries that are common on Tom Oxnard's HO scale Boston & Maine RR.



1950s railroading on the Boston & Maine in northern New England

By Thomas Oxnard • Photos by the author

When I started my layout in 1996, my plan was to build a model railroad with a northern New England theme. It would include scenes of a typical small seaport, a small city, towns, and the countryside including the mountains. In particular, I wanted plenty of scenes showing scale figures at work or play.

I enjoy watching HO trains rolling through the countryside, but decided to go with a modest plan that I could build and detail within the time constraints of my busy family and professional life. Most of the time I'm the only operator, so I decided on a single-track main line with a variety of industrial spurs to provide some switching activity. Since I had little first-hand knowledge of the railroad industry, I figured I'd need to include a small yard

to hold my rolling stock and an engine terminal for the locomotives.

I've always liked the colorful paint schemes of the Boston & Maine RR, so it became the prototype that I followed as I built my freelanced railroad. This proved to be a good choice, as the B&M ran close to my home, and many of its signature structures and well-known scenic locations are nearby.

Early exposure

The traditional Lionel train set under the Christmas tree was my initial exposure to the hobby. My interest grew slowly as my family took trips by train into New York City. Those days, my father started an American Flyer S gauge layout around the walls of our basement, but his railroad didn't survive the move to another house.

2. Bradford is the small town on the original section of the layout. Building flats and tall shallow relief structures in the distance represent Bristol City.

Even so, it did inspire my brother and me to build an HO layout on two sheets of plywood during our early teens. It was a large oval with Erector set bridges, plaster mountains, and tunnels. We finished it with plastic buildings and scratchbuilt a few structures of balsa wood.

In 1992, I built a version of Linn Westcott's 4 x 8-foot *HO Railroad That Grows* with a great deal of help from my local hobby dealer's classes on layout construction. It eventually grew into a 6 x 9-foot railroad, but I was soon dreaming of a more elaborate layout with more spectacular scenery.

The ultimate plan

In the summer of 1996 I began to design my current railroad using John Armstrong's book *Track Planning for*



3. Cut stone was a common building material for retaining walls throughout New England, so Tom used it to support many of his scratchbuilt bridges.



4. Tom's neatly finished control panel is mounted on the end of his previous layout, which is incorporated as the middle lobe of the current track plan.

Realistic Operation and Don Mitchell's book *Walkaround Model Railroad Track Plans* for inspiration.

My initial layout space was 18 feet long and 15 feet wide. However, one end was limited to 11 feet by immovable utilities. My previous 6 x 9-foot layout became the middle lobe of the new railroad. This gave me an E-shaped configuration with two very narrow aisles. But as the sole operator, I could live with the narrow aisles.

Initial construction

Room preparation came first, so I cleared the space, insulated the walls, and finished them with Sheetrock. I also installed a drop ceiling and fluorescent lights. Then I added a backdrop made of $\frac{1}{8}$ " tempered Masonite with coved corners. I painted it white first and then blended in a sky blue with a roller. Then I added the clouds using flat white and gray spray paints.

My benchwork is freestanding, but quite solid, thanks to Linn Westcott's L-girder technique. It has 2 x 2 legs, plywood gussets, and crossbracing that's secured with glue and screws. I made the benchwork in five separate sections that are held together with $\frac{1}{4}$ " bolts and wing nuts so it can be disassembled if moving becomes necessary.

All of the layout edges are covered with $\frac{1}{8}$ " Masonite fascia. I've painted it brown to make it less noticeable. Dark green curtains, held on by hook-and-loop fasteners, cover the clutter and allow easy access to step stools, a vacuum cleaner, and everything else.

I run the railroad with a Digitrax Super Empire Builder Digital Command Control (DCC) system fitted with wireless radio throttles.

My central control panel allows me to align any of the 45 turnouts from one location, with dual color (red or green) light-emitting diodes (LEDs) to indicate the routing.

One large transformer runs the DCC system, and a second one supplies a capacitor discharge unit that operates the twin-coil switch machines. I have one DCC plug port in each aisle. To prevent potential power problems, I ran 14 AWG bus wires around the layout with track feeders every three feet.

Scenery techniques

I gradually filled the layout's open spaces with stacked insulation board glued together with Liquid Nails for Projects. After shaping the foam, I applied a coat of latex paint and added ground foam texturing. One large mountain is sculpted from Styrofoam and plaster. Some areas also have cast



Illustration by Rick Johnson

► The layout at a glance

Name: Boston & Maine RR

Scale: HO (1:87.1)

Size: 15 x 18 feet

Prototype: freelanced B&M

Locale: New Hampshire seacoast
to the mountains

Era: September 1954

Style: walkaround

Mainline run: 115 feet

Minimum radius: 22"

Minimum turnout: no. 6

Maximum grade: 3.5 percent

Benchwork: sectional, open grid,
and L girder

Height: 42" to 48"

Roadbed: cork and Homasote

Track: Atlas code 100

Scenery: extruded-foam insulation
board base textured with plaster
rock castings and ground foam

Backdrop: hand-painted hardboard

Control: Digitrax Digital Command
Control (DCC)



5. Consolidation no. 2360 is entering the steep grade leading to the steel truss bridge above Bradford as it heads for the Warrenton staging yard.



6. Most of the downtown Bristol City structures are built on a narrow shelf supported by retaining walls. The shelf covers the back three yard tracks.

Hydrocal rocks that I secured to the scenery with Gypsolite plaster.

The scenery was well along when I decided to add a city scene behind my main terminal. This yard consisted of a 21" wide shelf filled with seven tracks, leaving no space for anything more than a city backdrop.

John Pryke's book *Building City Scenery* gave me the idea to build a platform 84" long and 9" wide that covered the back three tracks along the wall. This gave me sufficient real estate to install three-dimensional buildings, partial buildings, and flats in front of the backdrop. Thus, my city now has a railroad station, hotel, many stores (some with interior details), interesting streets, figures, and vehicles. Lately, I've added working traffic lights from Berkshire Junction and an animated sign from Miller Engineering.

A sloping hillside town makes the transition from the yard and round-house level down to the seaport. It also conceals the loop that provides access to the staging tracks beneath the yard.

As my scenery progressed, I added a variety of buildings and structures. Every kit I built taught me new modeling techniques, and I began kitbashing and scratchbuilding to replace some of the original structures.

I'm fascinated by bridges, so I especially enjoyed building as many different bridge styles as I could. Thus, the layout includes examples of Pratt truss, Warren deck truss, steel trestle, through plate girder, deck plate girder, framed timber trestle with tall bents, wood truss, and culverts.

Continual improvements

After six years, the initial construction was done and I began concentrating on improvements. Initially I was somewhat fearful of ripping up previous work, but the end result has always come out well and been worth the effort. Over the years I've broadened two tight curves and partially straightened a tight S curve. The hardest thing is re-weathering the track with spray paint when it's surrounded by finished scenery. However, each time I've managed to improve the scenery, put in a better bridge, or add space for another interesting building.

I replaced some of my original buildings, which weren't up to my current standards of detail. The overall village received a facelift, and I landscaped the central green with a monument, gazebo, cannons, hedges, and people. To complete the scene, I added nearly 400 hand-painted figures and more than 100 hand-finished vehicles.

Seaport modeling



Most of New England's smaller coastal towns are compact enclaves that were built close to the water in an age when people had to walk everywhere. Many of the dockside structures are historic buildings that haven't changed in years.

The seaport is the first thing visitors see as they enter the railroad room. I enjoy sailing along the coast of northern New England and wanted to capture the charm of its docks, wharves, buildings, rocky shores, and lighthouses. The scene has a variety of fishing and other workboats, a tugboat, and pleasure boats. Of course, many figures are posed to show people busy with their daily activities.

The ocean is a piece of 1/4" Masonite painted with a blue-green-black blend of acrylic paint. I then applied the seaweed by coating the piers, walls, and rocks with white

glue and sprinkling on sawdust. I painted the sawdust with Polly Scale *Empire Builder* Green.

I glued the boats on the Masonite water and then poured on a 3/16" layer of Enviro-Tex Lite. I held this in place using several layers of Scotch masking tape as a dam around the edge. The result was a beautifully smooth and clear finish, not quite like the ocean. I added waves using Polyterrain Water Gel which I slowly applied over three hours. It made a very choppy surface, so I applied another thin layer of Enviro-Tex Lite to make the perfect ocean. — T. O.

Rolling stock improvements

In addition to upgrading the scenery and structures, I reworked most of my rolling stock. I began assembling resin craftsman car kits by Funaro & Camerlengo. Here again, I learned many detailing tricks and began using similar techniques on my older cars. I detailed many of my veteran cars with new side ladders, grab irons, stirrup steps, and running boards. I weathered my models with an airbrush.

I spent an entire summer converting all of my cars to Kadee Magne-Matic knuckle couplers. Then I replaced all the car wheelsets with RP-25 contour wheels and added weight as needed to bring everything up to the National

Model Railroad Association's recommended weights.

My modeling workbench is upstairs in our hobby and computer workroom. Even though my wife spends hours on the computer and I spend time at my projects, we do spend some quality time together.

Motive power

As the layout developed, I chose September 1954 as its time period. This allowed me to use Electro-Motive Division GP9s, but my GP38, GP18, and some newer cars had to go. That's when I realized that I was missing some important B&M locomotives, so I added a Broadway Limited E7 for passenger

trains, an Atlas GP7, a Proto 2000 GP9, and my first brass steam locomotive, an 0-6-0 switcher.

My friend Mike Simonds, helped me upgrade my DCC system with wireless throttles, allowing me to move around freely to view the moving trains from all angles as they enter and leave the yard or towns along the line. Mike also installed sound in six of my engines, and that added an entirely new dimension of fun.

I bought a wireless micro-camera system from Micro-Mark and placed it in an open hopper. I now have the engineer's view of the entire layout and can appreciate the scenery from a different view on the TV. My visitors love it.



7. The Boston & Maine's streamliner, the *Flying Yankee*, pulls into Bradford's depot on Tom's original railroad. This short, Budd articulated train operates smoothly through the layout's relatively tight radius curves.



▶▶ Meet Tom Oxnard

Tom and his wife, Sally, are both pediatricians who live and practice in Exeter, N.H. They have four grown children, Nate, Andy, Geoff, and Rachel. Tom's other hobbies include photography, woodworking, furniture building, skiing, sailing, hiking, and golf. The couple also raises Connemara ponies.

Revised staging

As the layout became operational, I quickly realized that it needed a better staging area, since the original location under the main yard turned out to be nearly inaccessible.

I'd recently completed an addition to the house that included a basement room adjacent to my train room. It didn't take long to negotiate a right-of-way and tunneling rights through the concrete wall into the new room, where I built a 15-foot shelf to hold a five-track, double-ended staging yard.

One yard lead turnout is concealed under a removable foam board mountain. Adding the turnout for the opposite lead was easy enough, but installing the track was far more challenging, as I had to work it in behind some finished plaster rock walls and under another mountain. Cutting the openings through the concrete wall at the correct angle and height was yet another adventure. Then I lined the openings with Masonite panels that I fastened in place with Liquid Nails.

The yard is made of 1/2" plywood and 1/2" Homasote and finished with red birch trim to match my control panel. All the turnouts in the yard are manual, and the new wireless throttles allow

easy movement between rooms. I also hung a display cabinet with glass doors on the wall above the staging yard to store unused rolling stock.

Continued progress

Although my freelanced railroad's period has been determined, I've yet to decide where it fits into the prototype B&M's map. Its city and towns remain unnamed while I continue reading and researching the prototype. One of my problems is deciding if I want to move toward more specific prototype modeling or keep it freelanced.

Though my track plan is fairly simple, I enjoy running trains over the line. My friend Bruce Robinson and his crew have introduced me to the operations side of the hobby, and my attendance at their monthly op sessions has helped me learn a great deal. Eventually, I'd like to add a car-forwarding system to my B&M railroad.

Like many model railroads, my version of the B&M is a work in progress. From time to time I've thought about shrinking the width of the center section to get larger aisles, but I don't want to lose the large expanse of finished scenery. As a one-man show, the railroad runs fine just as it is. **MR**

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15577	NYC HW 3 Pack	259.95	31750	NYC Hot Box Reefer Set	298.95
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15588	Southern HW 4 Pack	319.95	36547	Bethlehem Steel Transfer Cab	28.95
17474	D&H Gondola w/Load	46.95	36550	Halloween Transfer Caboose	32.95
18364	PRR BB-1 2 Pack	579.95	36560	C&O Caboose	33.95
18371	Tuscan 5 Stripe G6-1	789.95	36593	NYC Caboose	33.95
18372	Green Single Stripe G6-1	789.95	36782	Jumping Disney Boxcar	38.95
18374	Congressional G6-1	684.95	36783	Disney OP Boxcar	44.95
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19292	6464 Series V1 3 Pack	132.95	39273	6464 Archive 3 Pack	99.95
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21877	Domino Sugar Tank Car	98.95	48047	UP 4-8-4 Northern	439.95
21879	C&E Hopper 3 Pack	102.95	48053	PRR Mikado	519.95
25114	Lionel Lines Pass 3 Pack	87.95	49614	PRR Pass Set	479.95
25156	Zephyr Streamline 4 Pack	147.95	K-L 621267	PRR Box Cab Electric	\$75.00
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25450	PRR 18" Alum. 4 Pack	399.95	K-L 622140	CNJ Box Cab Electric	\$75.00
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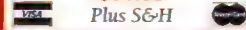
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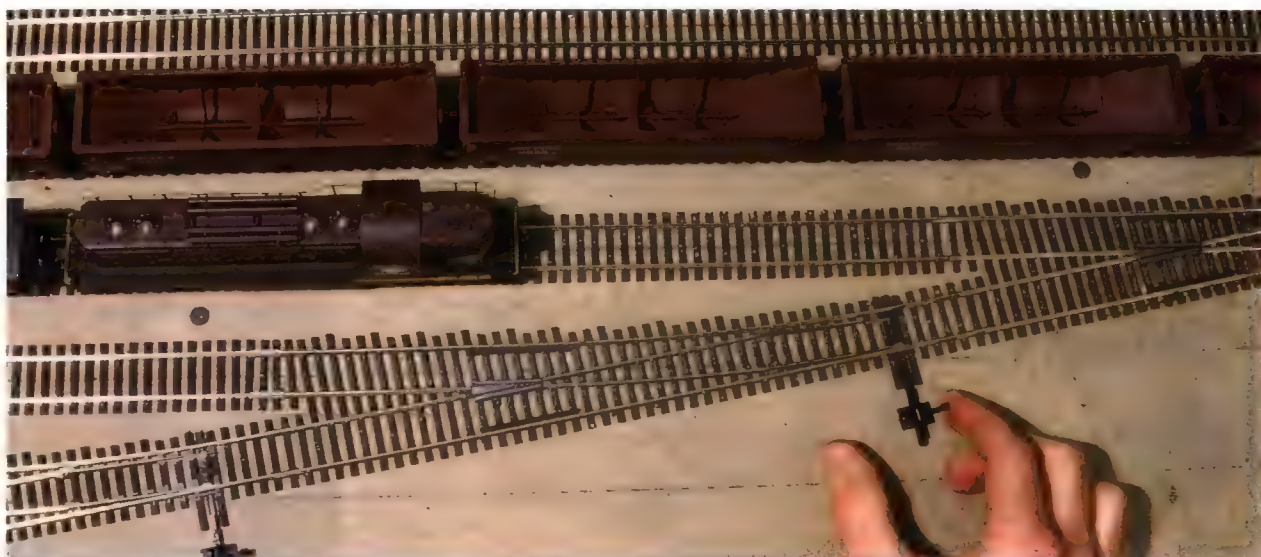
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Digital Command Control and turnouts



Turnouts are where short circuits often occur on Digital Command Control layouts. Mike Polsgrove explains common sources of electrical shorts and ways to fix them in this month's column. David Popp photo

If you've converted your direct current layout to Digital Command Control (DCC), you may have noticed that your locomotives don't run as smoothly over turnouts as they used to. Nothing really changed on the turnout, but the way your DCC booster behaves is different than your DC power pack. Even if you wired your layout for DCC from the beginning, you might notice that locomotives stall or the sound decoder restarts as they pass over the turnouts.

It's all about short circuits. Digital Command Control boosters generally have a higher current output than DC power packs. To protect your locomotives and layout wiring, DCC boosters have internal circuit breakers designed to trip when a short circuit is detected. Some modelers also add external circuit breakers when dividing their layouts into power districts.

The circuit breakers in the booster and the external breakers trip very fast, much faster than your old DC pack's circuit breaker did (assuming it even had one). When running on DC, small short circuits often went unnoticed because the locomotive's flywheel and the momentum of the train carried the engine past the turnout. With DCC, however, the circuit

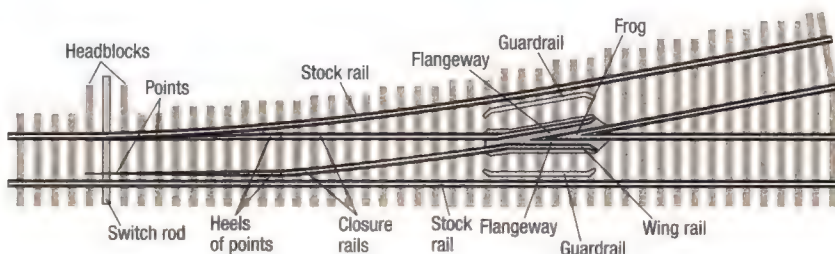


Fig. 1 Turnout terminology. Knowing how a turnout is constructed makes it easier to identify where a short circuit may occur. Illustrations by Rick Johnson

breaker is tripped, but not reset in time for smooth operation. So what causes these short circuits?

Construction of a turnout. To understand where these short circuits come from, you need to understand the construction of a turnout. See **fig. 1**.

Not all model turnouts are electrically the same. There are two types of turnout frogs, live (powered) and dead (insulated.) Live frogs are metal and change polarity depending on which way the points are aligned. Sometimes the polarity of the frog is changed by contacts on the switch motor or some other single-pole, double-throw switch that is flipped at the same time the turnout is lined. Some turnouts depend on the points to power the frog. Often live-frog turnouts, especially if handlaid, will have a

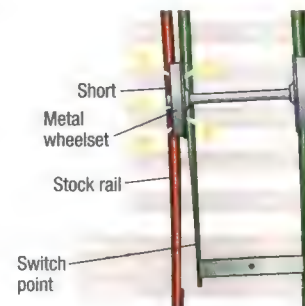


Fig. 2 Point rail. Short circuits at switch points may be caused by the wheels or rails being out of gauge.

solid switch rod between the points. Because of that, both point rails always have the same polarity. When a metal wheel contacts a stock rail and point rail of opposite polarity at the same time, a short circuit occurs. See **fig. 2**.

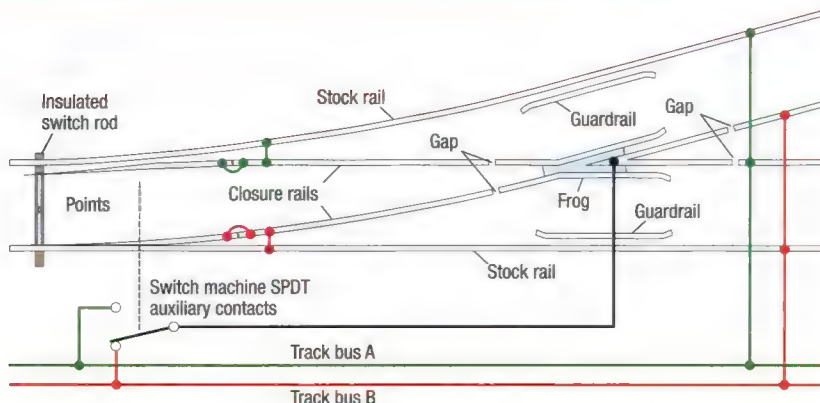


Fig. 3 Isolating the point rails. Wiring a power-routing turnout so the polarity of the point rails always matches their respective stock rails is an easy way to prevent short circuits on your layout.

To fix this, make sure that the wheels and track are in gauge. The National Model Railroad Association standards gauge is an indispensable tool for this task. It can be used to measure wheel gauge, flangeway widths, and track gauge.

The NMRA also has a point clearance standard to provide electrical separation. Point spread provides clearance greater than the flangeway.

You can also modify turnouts to eliminate short circuits. I cut electrical gaps on the closure rails near the frog and jumper the stock rails to the nearby point rails, as shown in **fig. 3**. I also replace metal switch rods with insulated ones made from printed-circuit board material. I solder the points to the copper on top of the board and then cut a gap between the points in the copper cladding. If the turnout depends on the points to carry the electrical current to the frog, an external switch will need to be added.

Dead frogs aren't powered and don't require an external switch. By necessity, the section of the frog that isn't powered has to be very small to prevent locomotives from stalling. This means that two rails of opposite polarity are very close together as they leave the frog. The tread of a metal wheel can bridge the gap between the two rails, causing a short circuit. See **fig. 4**.

Perhaps the easiest way to fix this problem is to coat the area

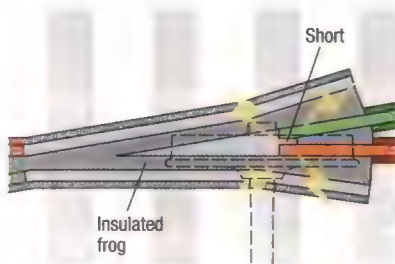


Fig. 4 Frog trouble. Short circuits can occur on turnouts with an insulated frog if the wheelset bridges the two powered diverging rails.

with nail polish or a dab of epoxy, being careful not to fill the flangeway or insulate too large of an area. The nail polish or epoxy will wear off after you've run trains for a while, so reapplication will be necessary.

The same turnout problems exist on DC and DCC layouts – they're just more noticeable on the latter. Correcting short circuits isn't hard, but it does take a little detective work to determine the source of the problem.

For more information on making your model railroad run as smooth as possible, see David Popp's article "Five steps to troubleshoot a DCC layout" on page 48 of this issue. **MR**

Send your questions about Digital Command Control to DCC Corner, *Model Railroader* magazine, P.O. Box 1612, Waukesha, WI 53187, or e-mail dcc@mrmag.com. We regret we can't answer all the questions we receive.

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Product Reviews



Athearn offers an impressive model of Union Pacific's powerful gas-turbine

The distinctive grid of air intakes on the sides of the body make Athearn's new locomotive model immediately recognizable. The Union Pacific bought 10 gas-turbine-electric locomotives from General Electric between 1952 and 1953, putting them in charge of long-haul freights in the western Rocky Mountains. Athearn's model is a faithful reproduction of this first generation of gas turbines. Standout features include a dual-flywheel drivetrain, see-through walkways, wire grab irons, and an articulated mechanism that lets this 11-inch-long locomotive negotiate 18"-radius curves.

A new idea. After World War II, the Union Pacific was shopping for the next big idea in locomotives. To minimize maintenance costs, the railroad sought a high-horsepower locomotive that could take the place of smaller units in multiple. General Electric, which had success with turbines in aircraft, suggested a turbine-powered locomotive.

Nicknamed "Big Blow" due to the turbines' jet-like exhaust, UP no. 50, a prototype gas-turbine locomotive started extensive testing on the railroad in July 1949. After testing no. 50 for nearly two years

and more than 100,000 miles, the UP ordered 10 more of the 4,500-hp units in March 1951. But unlike the double-ended no. 50, nos. 51-60 were single-ended, allowing a slightly larger fuel tank.

Fuel capacity was an issue in operation of the gas-turbines. They drank fuel at a rate nearly double that of a similar-sized diesel. However, the turbines were still economical, because they ran on

bunker "C" oil, a cheap and abundant by-product of oil refining. In 1955, the UP added a 22,000-gallon fuel tender to extend the range of the gas-turbines.

The design underwent a number of changes, even during the production run. The turbines, which required a constant flow of fresh, cool air to run at top efficiency, worked poorly when run at slow speeds in tunnels. Hot exhaust gases would back up and get sucked back into the turbine. A new, backward-angled exhaust stack helped eliminate this problem.

The first-generation turbines took in air through square panels on the sides of the carbody, protected by stainless steel Farr grills. In 1953, the intakes were moved to the roof, and the Farr grills were removed. Our sample, numbered 54, includes the angled exhaust, roof-mounted air intake housing, capped front side grills, and fuel tender of a post-1955 unit. Other road numbers have different details, such as no. 51's Farr grills.

The Union Pacific's venture into gas-turbine locomotives ended in 1970, as demand from the nation's growing plastics industry made the once-cheap bunker "C" fuel oil less cost-effective.



UP added oil tenders in 1955. Athearn's has a backup light.

- 80 Broadway Limited Imports
Paragon2 N scale E8 diesel
- 82 Bachmann Dynamis DCC Pro Box
- 84 Walthers HO scale Hulett unloader

- 86 Southern Car & Foundry HO tank car
American Z Line covered hopper
- 88 Micro-Trains N scale SP caboose
Cripplebush Valley HO urban castings

Dana Kawala



Keeping up appearances. The Athearn gas turbine is a sharp looking model, with an abundance of wire grab irons, etched-metal grills, and molded-in details adding to its realism. Etched-metal wipers are fixed to the windshields; the engineer's control stand includes a throttle lever. The nose-mounted Mars light has both red and white lenses, though only the white light illuminates. (The lighting bracket under the hood has a space to add a microbulb for the red light in case a modeler chooses to add a Digital Command Control decoder that supports its operation.)

The Armour Yellow and Harbor Mist Gray paint on our sample is smooth and even. The fine black outlines on the red "Union Pacific" and number 54 are crisp and perfectly aligned. The red stripes on the top and bottom of the yellow section of the carbody are not the same glossy, opaque red as the lettering, though, and the overlap of the gray and red is visible.

The plastic body shell's tooling is impressive, with finely molded details. The model's major dimensions match those on prototype construction drawings reproduced in Thos. R. Lee's definitive book *Turbines Westward*.

The model's knuckle couplers are at the correct height, but their trip pins hung too low. I easily adjusted them with a pair of Kadee trip-pin pliers.

An inside look. Removing four screws that flank the trucks allowed me to lift the plastic shell off the one-piece, cast-metal chassis. The five-pole can motor and its turned brass flywheels are in the middle of the frame's central tower, under a clear plastic plate. This is a good idea, as it protects the moving parts from dust that might be drawn into the body through the open exhaust vents directly above.

On either end of the frame are two 1.2" spaces for the installation of speakers, with sound holes milled into the base above the end trucks. There are DCC decoder plugs on the printed-circuit boards in the back of the locomotive. A number of manufacturers, including QSI Solutions and SoundTraxx, offer or are planning sound decoders for the Athearn gas-turbine models.

Plastic universal drive shafts connect the motor to gearboxes on the two inboard trucks. The two sets of trucks pivot at this gearbox, which is above the locomotive's third and sixth axles. Pivoting cast-metal plates extend from the inboard trucks to the outboard trucks. Spring-loaded screws attached to the end of each plate ride in slots in the outboard trucks. The outboard trucks can float and pivot over a broad range of motion, which lets the nearly foot-long locomotive negotiate 18"-radius curves. The model would look better on broader curves, though.

Weighing in. The engine tips the scales at nearly two pounds, not counting the tender. This provides the model with plenty of traction, despite the fact that only the four inboard axles are powered.

The Athearn model's headlights lit and its five-pole, skew-wound motor started turning at just over 1 volt (V). The locomotive rolled smoothly at 1.4V, at a scale speed of 1 mph. At 12V the locomotive reached a top speed of 73 scale mph. This is only slightly faster than the top speed of 69 mph listed for prototype no. 50 in the 1950-52 Simmons-Boardman *Locomotive Cyclopedia of American Practice*.

►► HO scale UP gas turbine

Price: With tender, \$299.98;
without tender, \$229.98;
tender alone, \$89.98

Manufacturer

Athearn Trains
2883 E. Spring St., Suite 100
Long Beach, CA 90806
www.athearn.com

Road numbers: (all Union Pacific) with tender, 54 and 58; without tender, 51 and 60; tender not numbered

Era: 1952-62 (nos. 51, 54);
1953-64 (no. 58); 1953-63
(no. 60)

Features

All-wheel electrical pickup on locomotive (no pickup on tender); eight-wheel drive
Backup light on tender
Detailed cab interior
Eight- and nine-pin DCC decoder sockets
Five-pole, skew-wound can motor with dual brass flywheels
Interchangeable nose trim (above pilot)
McHenry plastic magnetic knuckle couplers at correct height
Minimum radius: 18"
RP-25 contour metal wheels in gauge
Weight: (Engine only) 1 pound 14 ounces. (Engine and tender) 2 pounds 2 ounces

Athearn HO UP Turbine

Drawbar pull	Scale speed (DC)	
	Volts	Scale mph
4.5 ounces		
60 HO scale freight cars	1.4 (start)	1
	3	11
	9	53
Current draw at 12 volts (DC)	12	73
Slipping	.38A	
Stalled	.86A	

Through all its speed tests, the model's drive train operated smoothly and quietly. The unit's weight and two flywheels added a momentum effect when starting and stopping the locomotive.

With Athearn's new model, UP fans can keep the "Big Blows" rolling for years to come. — Steven Otte, associate editor



Dual-mode E8 passenger diesel delivers plenty of pulling power and sound effects

The rumble of 12-cylinder 567B engines and many other realistic sound effects highlight this Digital Command Control (DCC) sound-equipped E8 diesel in N scale from Broadway Limited Imports. The locomotive includes BLI's new Paragon2 sound decoder and operates on DC and DCC layouts.

Prototype. General Motors Electro-Motive Division built 421 E8A and 39 E8B diesels for North American railroads from 1949 to 1953. The E8 featured two new 567B engines that produced 2,250 hp, making it more powerful than its 2,000-hp predecessor, the EMD E7.

Electro-Motive built the last E unit, the E9, from 1954 to 1963. The 2,400-hp E9 was virtually identical in appearance to the E8.

The E8 locomotives hauled passenger trains on United States main lines into the mid-1970s. Several E8s continued in commuter service until the 1990s.

The dimensions of the BLI model match drawings in the *Model Railroader Cyclopedia, Vol. 2: Diesel Locomotives* (Kalmbach Publishing Co., out of print).

Appearance. Our review sample came decorated for the Atchison, Topeka & Santa Fe Ry. The prototype for the model, as with the 13 other E8s on the Santa Fe, were rebuilt by EMD in 1952 and 1953 from the railroad's E1 diesels. Classed E8M ("M" stood for modified) by the Santa Fe, these rebuilt units looked identical to a new production E8, but they had

some internal differences and were rated at 2,000 hp.

Lettering and striping placement of the model's red-and-silver warbonnet livery match prototype photos. On the prototype the sides of the body were unpainted stainless steel, while other silver parts, such as the truck sideframes and roof, were silver-painted metal. Broadway Limited accurately modeled this on the N scale E8 by using a brighter shade of silver for the sides of the body and a duller shade of silver for the roof, trucks, pilot, fuel tank, and rear.

Unlike the prototype, the molded-in class lights on the model are painted over with the same shade of red used on the body shell. Other molded details on the plastic body shell match prototype photos. Separately applied parts include etched-metal side grills and sprung end diaphragms.

The cab of the A unit features some interior detail, but painted crew figures aren't included.

Mechanism. To remove the body shell of the A unit I first removed the front coupler. Then I used two toothpicks to carefully spread the body shell to disengage four locking pins. Then I could lift the shell off the die-cast metal frame.

A can motor and two brass flywheels are enclosed in the lower half of the frame. Gearboxes above the trucks transfer power to all six axles. The rear wheels of the rear truck have traction tires, helping the engine achieve an impressive 1.6 ounce drawbar pull.

The DCC decoder is mounted on top of the rear half of the frame. A single downward-facing speaker in a plastic enclosure is mounted on top of the front half of the frame. Two light-emitting diodes (LEDs), one for the headlight and another for the Mars light, are attached to a separate printed-circuit board mounted to the front of the cab interior assembly.

DCC performance. In DCC the model includes 28 user-triggered functions. Along with the horn and bell, I enjoyed functions 4 and 5, which allow you to adjust the engine RPM level independently of the locomotive speed. I also appreciated function 7, which turned the Mars light on or off independently of the headlight.

The engine sounded like recordings of 567 diesels that I've heard. I liked the default horn sound, but if you disagree, there are two other horn sounds available.

The model includes the "macro" feature found in HO Paragon2-equipped models. You can record an operating sequence, including various sound effects, and then watch as the model runs through the sequence automatically.

I easily programmed the Paragon2 decoder using an MRC

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We ran the sound-equipped E8 diesels on our new N scale layout. Subscribers can watch the video online at www.ModelRailroader.com.



Prodigy Advance DCC system. Advance consisting a set of A-B-A diesels was very easy, and the procedure is clearly outlined in the instruction manual.

The model performed smoothly in our DCC speed tests. After programming CV5 (maximum voltage) to a value of 80, the model achieved a more prototypical 110 scale mph top speed.

DC performance. I tested the BLI E8 in DC using an MRC Tech 4 power pack. Out of the box, the headlight came on at 6 volts (V), but as I advanced the throttle the sounds didn't function and the model wouldn't move.

To fix this so I could run the engine required a BLI DCMaster Analog Programmer (\$39.99, sold separately), which allows you to program CVs on a DC layout. I programmed the analog motor control minimum voltage (CV252) to a value of 60. I also programmed the analog sound start (CV 131) to 50.

The lights and sounds on the model then started at 6V. At 7V the E8 started moving at 2 scale mph. After I programmed the analog motor control maximum voltage (CV251) to a value of 80 the model had a prototypical 110 scale mph top speed.

The DCMaster allows you to trigger the whistle, bell and other sound functions. You can run the E8 without the DCMaster and still hear engine and brake sounds.

Although the model requires a DCMaster to program it in DC mode, the BLI E8 ran well and sounded great. In DCC mode the model is easy to program and operate. This streamlined diesel features realistic sounds and

▶ N scale E8 diesel

Price: A or B unit, \$199.99;
Illinois Central A unit with
dummy B unit, \$249.99;
DC no sound, \$99.99;
Dummy B unit, \$74.99

Manufacturer

Broadway Limited Imports, LLC
9A East Tower Circle
Ormond Beach, FL 32174
www.broadway-limited.com

Road names: E8A or E8B:

Atchison, Topeka & Santa Fe;
Union Pacific.
E8A only: Canadian Pacific;
Chesapeake & Ohio;
Chicago, Burlington &
Quincy; Louisville & Nashville;
New York Central;
Pennsylvania; Southern;
Southern Pacific (E9A).
E8A only or E8A and dummy
E8B set: Illinois Central.
Undecorated E8A and E8B
units available with horizontal
or vertical grills and with or
without Mars lights.

Era: 1949 to 1990s

Features

All-wheel drive
Dual-mode Paragon2 DCC
sound decoder operates
on DC and DCC layouts
Electrical pickup on 10
wheels
Five-pole skew wound can
motor with dual brass
flywheels
Minimum radius: 9¾"
RP-25 contour metal wheels
in gauge
Two Micro-Trains magnetic
knuckle couplers
at correct height
Weight: 4 ounces per unit

BLI Paragon2 N scale E8

Drawbar pull		1.6 ounces	
		19 N scale passenger cars	
Scale speed (DC)		Scale speed (DCC)	
Volts	Scale mph	Speed step	Scale mph
7 (start)	2	1	2
9	50	7	22
10	80	14	46
12	155	28	147
Current draw at 12 volts (DC)		Slipping	.100A
		Stalled	.160A

would look great hauling an N scale lightweight passenger train. —
Dana Kawala, associate editor

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►► Dynamis DCC Pro Box

Price: Pro Box, \$450;
Infrared receiver, \$45;
Handset, \$150

Manufacturer
Bachmann Trains
1400 E. Erie Ave.
Philadelphia, PA 19124
www.bachmanntrains.com



Pro Box set expands the Dynamis DCC system

The Bachmann Dynamis Digital Command Control (DCC) system features intuitive programming, operating menus displayed on the handset's liquid crystal display (LCD) screen, and wireless infrared communication between the handset and an infrared receiver. The basic system, reviewed in the July 2008 *Model Railroader*, works fine for a small layout. However, it supports only one handset and its range is confined to a 180-degree line-of-sight reception arc around the infrared receiver. The Dynamis Pro Box expands the system, supporting up to three additional handsets and extending the system's range with plugs for up to four more wireless receivers. Like the other Dynamis components, Bachmann developed the Pro Box with Elektronik Solutions Ulm (ESU) of Germany.

Easy set-up and operation.

Installing the Pro Box was just as easy as setting up the basic system. Along with the Pro Box, the set includes an infrared extender, and an infrared receiver with 10-foot extension cable. All the components are modular, so the command station (sold separately in the basic set), Pro Box, infrared extender, and infrared receivers simply plug into one another. An ECosLink cable is included to connect the

Dynamis Pro Box to an ESU ECos DCC system.

I installed the Dynamis on our Milwaukee Road Beer Line HO scale layout while it was under construction. (See the January through May 2009 issues of *Model Railroader*.) We'd planned to upgrade to the Pro Box prior to our story about operations on the Beer Line in the May 2009 issue, but the components weren't available until after our story deadline.

Installation involved connecting leads from the layout's power bus to screw terminals in the Pro Box and plugging in the power supply. I then plugged a separate infrared receiver into the supplied 10-foot cable and plugged the cable into one of the ports of the infrared extender on top of the Pro Box. I placed the additional infrared receiver on a fascia-mounted shelf used for paperwork on the Beer Line.



The command station fits between the Pro Box and IR extender.

I recruited another operator and we successfully ran a Broadway Limited Imports SW7 and a Walthers H-10-44 at the same time without any

difficulty. When we turned on the two Dynamis handsets we had to wait a few seconds while they acquired the locomotive roster saved in the command station.

Using the two infrared receivers, we controlled the locomotives on two sides of the layout while it was configured as a freestanding table. Four infrared receivers would give us control from any side of layout. It would be helpful if Bachmann offered longer cables for the infrared receivers.

Expanded programming. With the Pro Box you can easily add an isolated programming track to your layout. Power leads from a programming track connect to screw terminals on the command station.

Using a programming track, you can assign your locomotives four-digit addresses. You can also read back configuration variables (CVs) from the Program on Service Track menu. Enter the CV and a Read option will appear on the screen.

The Dynamis Pro Box still supports programming on the main. However, in that mode, CVs can't be read back, and only two-digit addresses can be assigned.

A drawback of the Dynamis system is that it allows for just four handsets. Larger layouts will require an additional Dynamis command station and Pro Box.

That said, the Dynamis system with the Pro Box add-on is a good option for those looking for reliable, programmable control of their small- to medium-sized model railroads. — D.K.

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Fig 1: PANEL MOUNT



Fig 2: DIRECT CONTACT VOLTMETER SHOWN WITHOUT HOUSING



Fig 3: CURRENT METER



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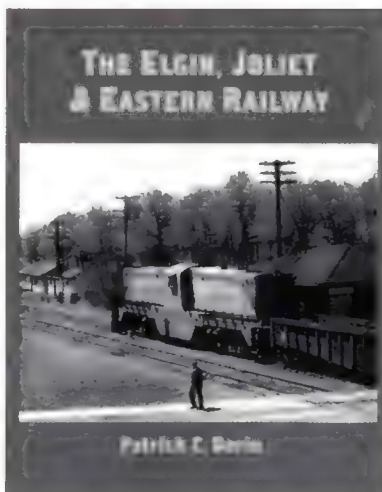
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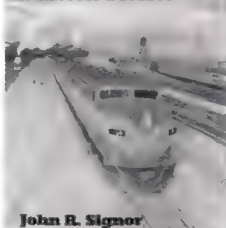
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Southern Pacific's Western Division



Southern Pacific's Western Division, John R. Signor

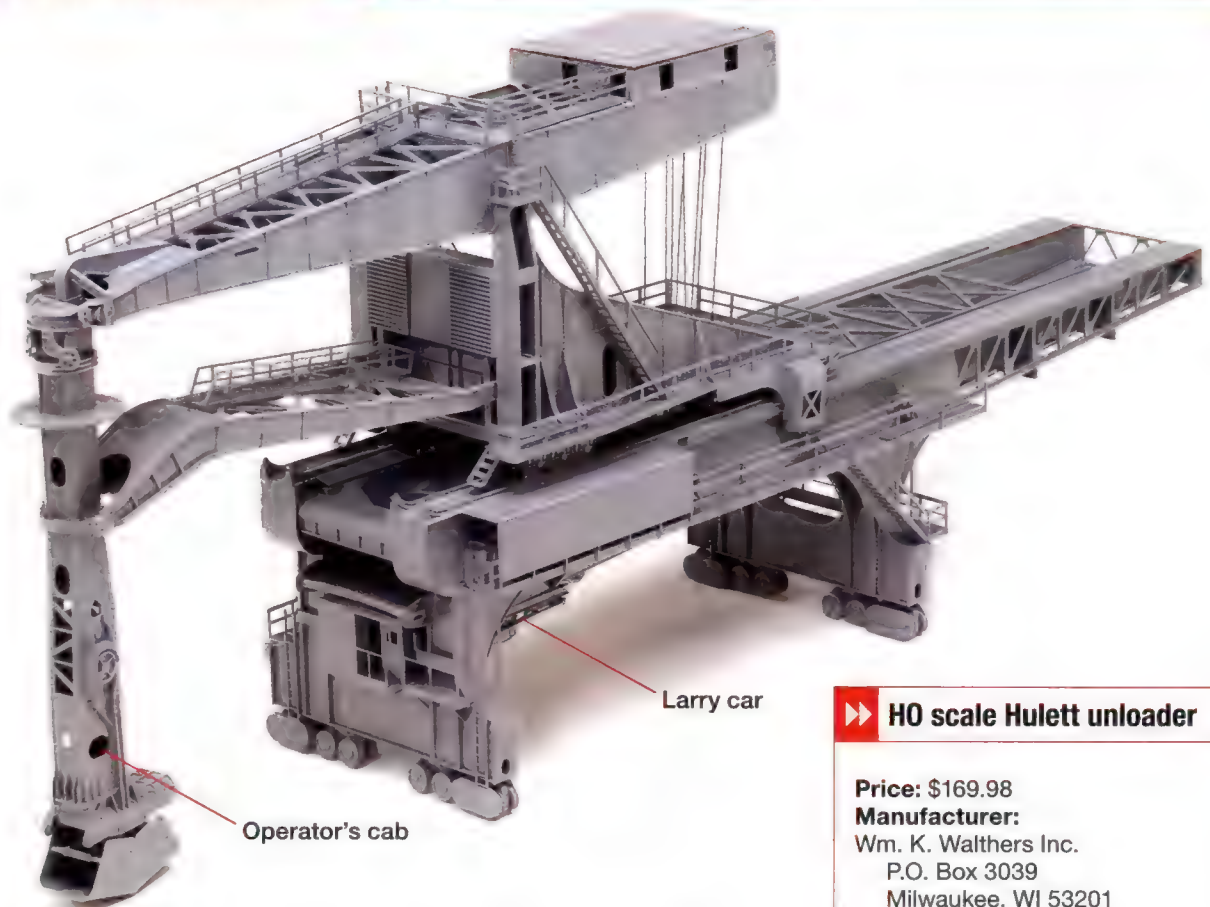
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▶▶ HO scale Hulett unloader

Price: \$169.98

Manufacturer:

Wm. K. Walther's Inc.

P.O. Box 3039

Milwaukee, WI 53201

www.walthers.com

Era: 1900 to 1990s

Detailed HO scale Hulett unloader kit is fun to build

This strange looking machine is a model of a Hulett unloader that transferred iron ore from ore boats to railroad cars. Invented in 1899, these machines were a common sight in ports throughout the southern Great Lakes. Hulett's were normally built in pairs that worked together to unload a single boat.

Each machine was custom-built, but they share a common design that Walther's has captured in this interesting model. The Hulett's came in a variety of sizes, and this is one of the more compact units.

Four tracks fit underneath, but the clearances are close. In its standby position, with the bucket sitting on the ore hopper, the model

is an impressive scale 125 feet long, 34 feet wide, and 85 feet tall.

A different breed. Opening the box revealed a pile of 17 sprues of strange-shaped parts. A well-illustrated 12-page instruction booklet is included, and everything is number coded.

Assembly goes well, but keep the instructions handy and leave the parts on the sprues until they're needed. I used a hobby knife, sprue cutters, a small flat file, and liquid plastic cement to build the kit.

The kit is divided into two large subassemblies starting with the base, which is like building a girder bridge that moves. It's supported by four huge eight-wheel trucks that allow the Hulett to move sideways along the dock on four rails (not included). This base spans four tracks where hoppers are loaded beneath the machine. A moveable ore receiving hopper and scale sits

on the top level of the bridge, while a larry car on the lower level transfers the inbound ore into the hopper cars underneath.

The second subassembly is the main carriage that rides on top of the base, and it can be moved to position the bucket. A massive walking beam tips back and forth to raise and lower the bucket leg. One operator controls the machine from a small cab built into the leg just above the bucket, and a stabilizing arm keeps the leg vertical. If you're careful with the cement, the completed bucket can be opened and closed and the leg will rotate.

The kit is cleanly molded in dark gray styrene. However, I plan to paint it grayish-black and add a patina of rust and iron ore dust.

Overall, I spent about 21 hours building the Hulett. It was a challenging project, but great fun.

For modelers, the next challenge will be figuring out how to animate one of these mechanical monsters.

— Jim Hediger, senior editor

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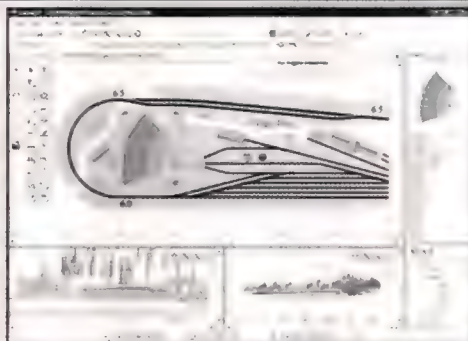
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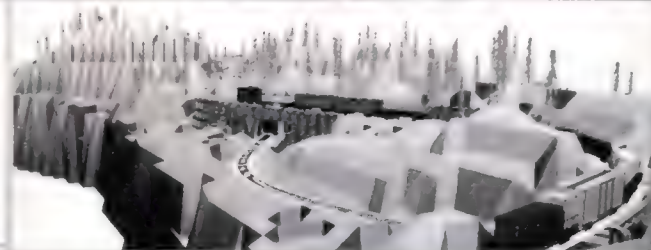
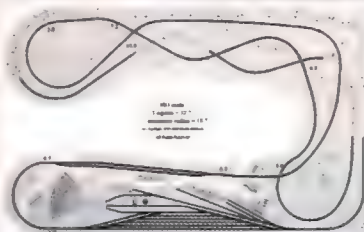
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Product Reviews

▶▶ Southern Car & Foundry HO two-compartment tank car



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and handling for up to three kits

Manufacturer

Southern Car & Foundry
970 Sunshine Lane, Ste. D
Altamonte Springs, FL 32714
southerncarandfoundry.com

Era: 1916 to 1960s

Comments: This well-detailed
model of a Standard Tank Car Co.
tank car fills two needs. There
have been few replicas of cars
with STC's distinctive box-bolster
underframes. Accurate HO scale
multi-compartment tank cars have
been rare as well.

Mostly molded in urethane
resin, SC&F's kit also includes
styrene and etched-brass details,

including cleverly designed
etched corner steps. Kadee no.
58 couplers are included to fit the
scale-width center sill. Decals for
General American Tank Car
(GATX) are also included, but no
trucks. I used Tahoe Model Works
Buckeye trucks.

Anyone who's built a few resin
house-car kits will be comfort-
able following SC&F's detailed,
well-illustrated instructions. The
same maker offers similar kits for
single-dome STC tank cars with
radial-course tanks. — *Andy
Sperandeo, executive editor*

▶▶ American Z Line American Car & Foundry covered hopper



Price: \$34 each, four-pack \$107

Manufacturer:

American Z Line
6142 Northcliff Blvd.
Dublin, OH 43016
www.americanzline.com

Era: August 1971-present

Comments: This Z scale covered
hopper is based on an American
Car & Foundry Center Flow
prototype. The injection-molded
plastic model has a one-piece
body with a separately applied
roof, end ladders, brake wheel,
and outlet gates. The running
boards are etched metal.

Our sample, Burlington
Northern no. 481564, is incor-
rectly decorated for a pre-August
1971 car. The model is available
in other road numbers correct for
this post-August 1971 BN car.

The dimensionally accurate
model, which weighs .5 ounces,
has trucks with knuckle couplers
at the correct height. The metal
wheels are all in gauge.

The car is available in seven
paint schemes. — *Cody Grivno,
associate editor*



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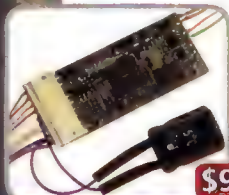
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Product Reviews

▶▶ Micro-Trains N scale bay window caboose



Price: \$32.85

Manufacturer

Micro-Trains Line Co.

P.O. Box 1200

Talent, OR 97540

www.micro-trains.com

Era: 1980s

Comments: The prototype for this N scale plastic model was one of the last cabooses purchased by the Southern Pacific Ry. in 1980.

The model matches drawings in *Freight Cars of the Southern Pacific, Volume 2: Cabooses* by Anthony W. Thompson.

Separate parts, include handrails and brake wheels. A

user-installed etched-brass radio antenna and smokejack supports are included with the SP version.

Most lettering matches prototype photos. The Clean, Oil, Test, and Stencil (COTS) panels list Conrail shops instead of those appropriate for the SP.

The plastic wheels are in gauge and the body-mounted Magne-Matic couplers are at the correct height. The car weighs just under one ounce, which follows National Model Railroad Association RP-20.1.

Micro-Trains did a fine job capturing this Southern Pacific prototype in N scale. – D.K.

▶▶ Cast rubber HO scale urban scenery

Price: \$20 (oil drums),

\$50 (urban outcrop)

Manufacturer

Cripplebush Valley Models

264 Saddlemire Hill Rd.

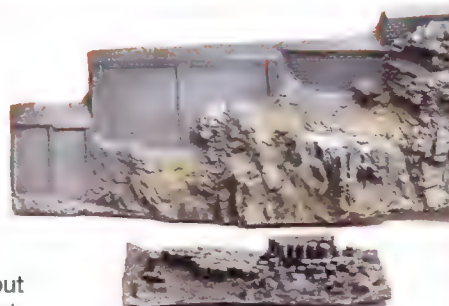
Sloansville, NY 12160

www.cripplebush.net

Comments: Cast-rubber scenery details have been around for several years now, but most model rock formations that are found in nature. Cripplebush has introduced two castings that model urban industrial settings.

The urban outcrop measures 5½" x 3½" and the oil drums have a foot print of 3¼" x 7". Both can be trimmed with scissors or a utility knife. You can use a hot glue gun or a rubber compatible adhesive to attach the castings to your layout.

The oil drums are modeled after a scene along the present-day Mohawk River in New York. The latex rubber works well to



capture the fine detail of the soil and debris along the river bank.

The urban outcrop is a scene found in the industrial section of many cities and depicts retaining walls made of poured concrete, cinder blocks, and red brick.

Both the urban outcrop and the oil drums are minimally painted. You can detail the castings further with acrylic paints.

These rubber castings provide a quick and easy way to add realistic industrial scenery to your layout. – D.K.

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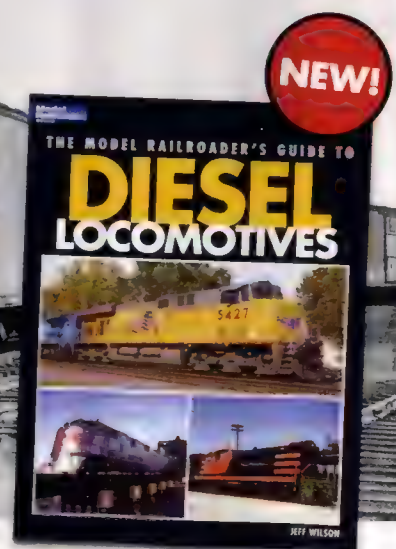
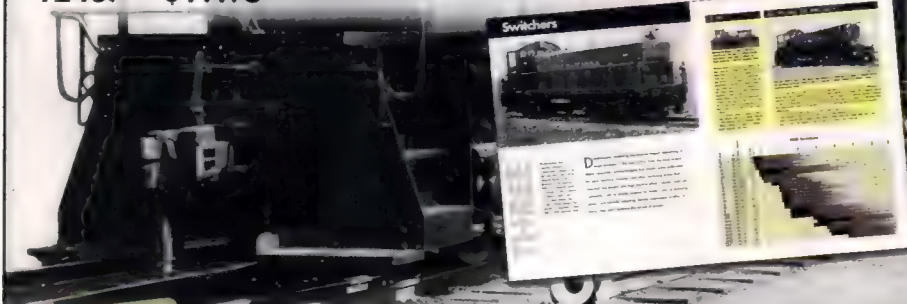
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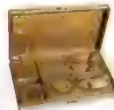
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Street running is the order of the day on Vic Smith's HO scale City Edge layout. Vic's stunningly detailed urban model railroad also features an elevated main line, custom cast-resin city structures, and dozens of hand-weathered and modified vehicles. Vic Smith photo

Double-headed Decapods pound through Weirton Junction on Bill Neale's HO scale Pennsylvania RR Panhandle Division layout. Bill's multi-level system is set in 1939 and features heavy traffic behind standardized Pennsy steam power. Bill also shot the photo.

A train of Union Pacific coal empties exercises trackage rights at Sullivan's Curve on the Santa Fe line through California's Cajon Pass. Ron Sipkovich's N scale system presents this popular railfan venue as he came to know it beginning in 1985. Ron

Sipkovich photo

A diamond-stacked Consolidation and a towering forest convey the mood in a photo Paul Scoles shot on his Sn3 Pelican Bay Ry. & Navigation Co. This California narrow gauge line set in 1895 maintains a balance between Paul's interests in dramatic scenery and entertaining operations.





A Baltimore & Ohio freight eases downgrade on Greg Johnson's HO scale Allegheny Terminal RR. Greg models industrial railroading around Pittsburgh circa 1952. The Pennsylvania RR is the major player, but the B&O and other carriers also have important roles. Greg

Johnson photo



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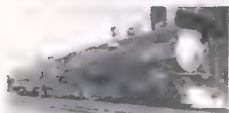
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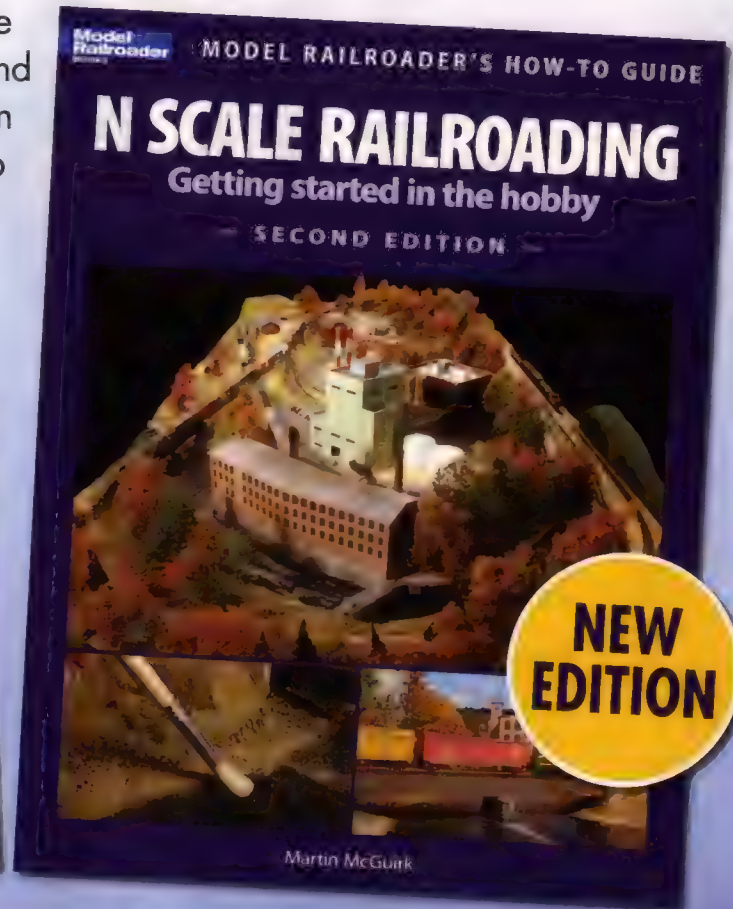


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There have been numerous advances in N scale railroading since the first edition of this book, and the author addresses them all, from track to train control. He takes beginners through step-by-step chapters showing how to build and operate a complete N scale 4 x 8-foot railroad.

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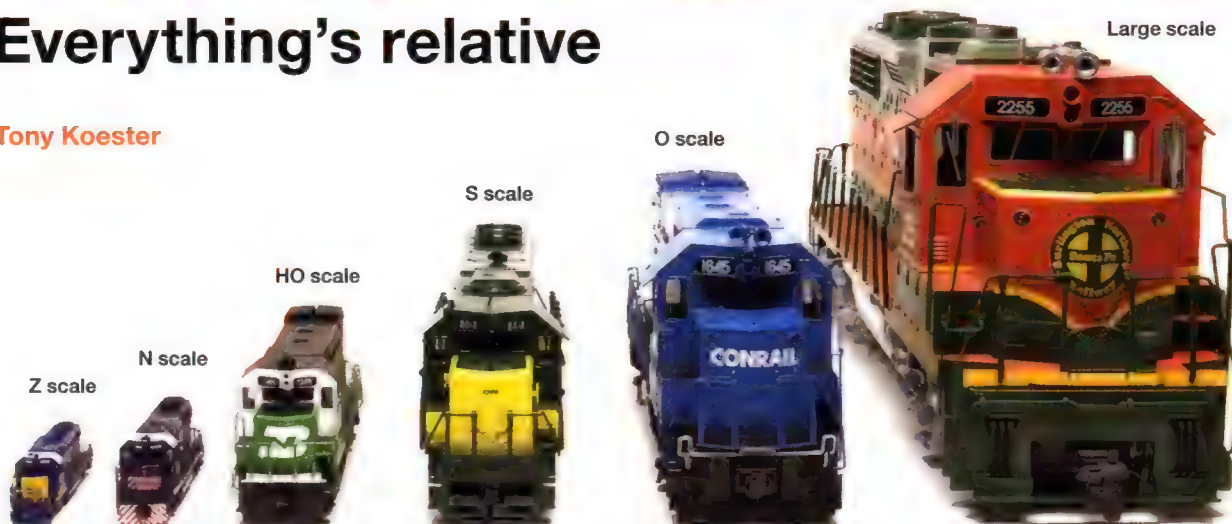


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Everything's relative

Tony Koester



It's easy to judge which of these Electro-Motive Division locomotives are "big" and which are "little." Or is it? Proportions represented here include (left to right) 1:220, 1:160, 1:87.1, 1:64, 1:48, and 1:29. Bill Zuback photo

It was January 1988 and well below zero in New Hampshire, where my son John attended college. But his basketball team (did I mention he stands 6'-7"?) managed to escape winter's icy grip by playing games in Florida, where it was sunny and 69 degrees.

"We all immediately donned shorts and T-shirts," John recalls. "There were five or six guys at the pool with no shirts, and three of them jumped into the outdoor pool.

"A high school buddy, Marty, came over to the hotel to say hello. He was wearing a long-sleeve shirt and a jacket, and he was cold. When he saw the guys jumping in the pool, I thought his eyes were going to pop out of his head. I told him he'd been in Florida too long!"

Everything's relative.

The debate about which scale and gauge are the best has raged since scales were numbered Naught, One, Two, and so on. Naught is printed 0, which looks odd, so it became O, and a scale about half its size became H-O, now HO.

The "tiny" scale, O, seemed a bit puny compared to No. 1 gauge trains – and, as shown in the photo above, it still does, in fact. You see No. 1 gauge stuff all the time, as that's the gauge used for 1:32 "large scale" standard-gauge models. Bulkied-up 1:29 models also roll on No. 1 gauge track, as do LGB's 1:22.5 G scale meter-gauge (technically, "Gnm") trains and Bachmann's 1:20.3 "Fn3" trains.

No matter the technicalities, anyone can see that large scale is, well, larger than O scale, which is about twice the size and eight times the bulk of HO.

Between O and HO is S scale, at 1:64. And below HO is TT scale, at 1:120 (not shown above). It still has some following in Europe and a few holdouts on this side of the Atlantic. It's not hard to understand why: In a more logical world, we probably could have gotten by quite nicely with S and TT alone, but that's not how the cards were played.

Then along came OOO, later standardized in North America at 1:160 and called N scale. Predictably, it was just over half as large as HO. The downward progression continued, perhaps simply to prove it could be done, with Z scale at 1:220. There are some remarkably well-detailed and good-running models in Z scale. And anyone who dismisses it out of hand has a short memory about how we viewed N scale in its formative years, which is now the second most popular modeling scale.

There is no ideal scale, nor is there a wrong one. What works for one person may not fit the needs of another. Put more positively, you can enjoy modeling in more than one scale and gauge. For example, a modeler may have long double-stack freights in N scale in the basement, a large-scale garden railroad out back, and also enjoy building an On3 or Sn3 logging railroad in

his spare room. Model railroad imperialism knows no bounds.

A fascinating thing about the various scales is how their apparent size changes depending on how we compare them. I occasionally operate on MR managing editor David Popp's beautiful N scale layout, and after an hour or so, its size seems "normal." When I get home, my HO models are suddenly transformed into massive beasts. The cure for that is to stop by Tom Piccirillo's O scale traction layout or take a ride behind his live steam locomotive; HO soon becomes compact once again.

Physical limitations may point us toward a certain scale and gauge. For example, aging eyes make O or larger scale modeling appealing, as do less-steady hands. It's nice to be able to see what we're trying to accomplish, and then, what we actually did accomplish.

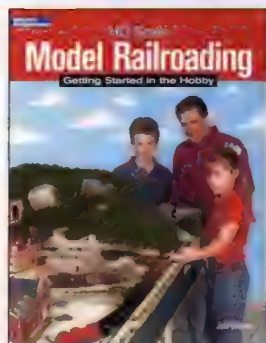
Infirmities aside, I recommend walking a mile in another modeler's shoes before you decide that your age-old favorite scale has lost some of its luster. It could be that you simply need a refresher course in its advantages. Drop by a friend's or a club's layout that features a different scale, and then take another look at your current models with "fresh eyes" as though you had never seen them before. You may rediscover the attributes that first attracted you to them.

It just goes to show that everything is, indeed, relative. **MR**

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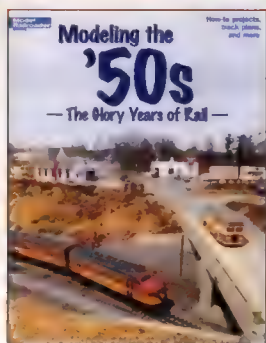


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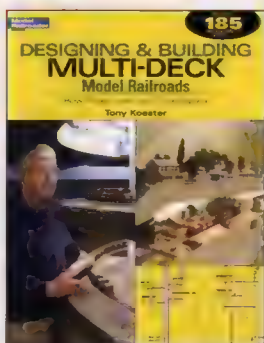


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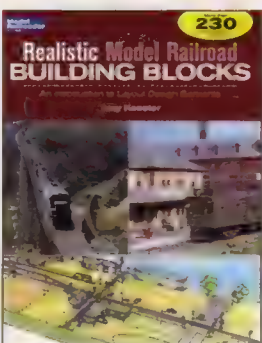
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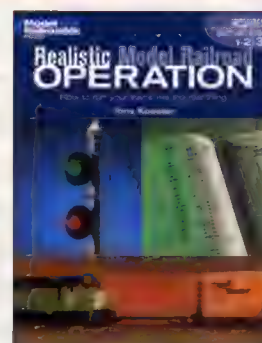
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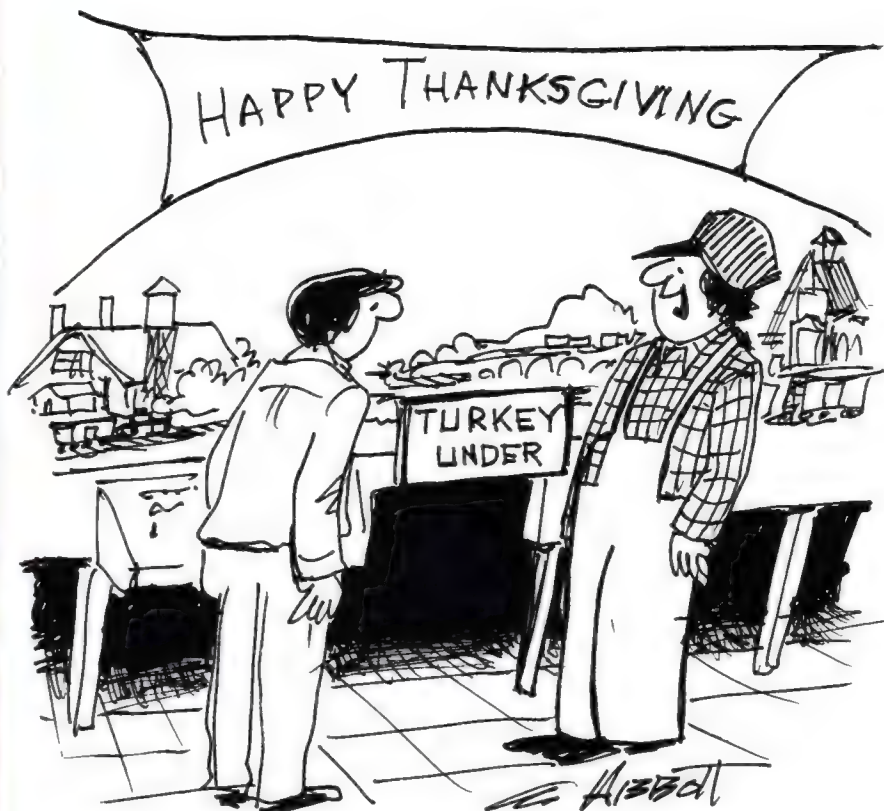
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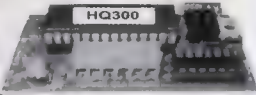
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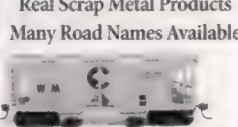
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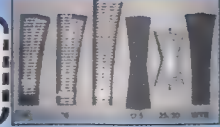
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All ads must be prepaid and pertain to the subject of model railroading.

CLOSING DATES: Jan 2010 issue closes Oct. 16, Feb. closes Nov. 17, Mar. closes Dec. 15, Apr. closes Jan. 18, May closes Feb. 18, June closes Mar. 18, July closes Apr. 15, Aug. closes May 20, Sept. closes June 17, Oct. closes July 15, Nov. closes Aug. 18, Dec. closes Sept. 16.

Note to Readers: Show dates, times and locations sometimes change. Confirm the details before driving any distance. Please go to www.mrmag.com and click on the **Schedule of Events** section to get more complete information on these and other coming events.

Schedule of Events

AL, BIRMINGHAM: Smoky City Rails Spring Model Train Show/Sale. 1st Baptist Church of Zion City, 1104 Gene Reed Road, Saturday, December 5th, 9am-4pm. \$5.00 adults; 8-12 \$1.00; Under 8 FREE. Handicap Accessible. FREE Parking. Operating Layouts. Door Prizes. Play with trains. Sonny. 205-980-0611 or scrmrrc@aol.com

CA, CROCKETT: CARQUINEZ MODEL RAILROAD SOCIETY'S DECEMBER MODEL RAILROADING SHOW. CMRS, 645 Loring, Second Floor, December 5-6, 2009. 10:00am-4:00pm both days. Donation: \$2.00 per person, under 16 free w/adult. Sponsored by Crockett Community Foundation. Featuring newly-built tri-level HO scaled 'Crocket Central'. Information: www.carquinezmr.org 510-787-6703.

CA, MENLO PARK: WEST BAY MODEL RAILROAD ASSOCIATION'S ANNUAL CHRISTMAS SHOW. Former baggage building near Menlo Park Train Station. Friday, December 11, 7:00-10:00pm; Saturday, December 12, 12:00-8:00pm; Sunday, December 13, 12:00-5:00pm. Free w/donations appreciated. Operating layout with O, S, HO. Contact: West Bay Model Railroad 650-322-0685.

CA, SANTA CLARA: NOR-CAL TCA 37TH ANNUAL SPRING CALSTEWART MEET Santa Clara Convention Center, 5101 Great American Parkway, Sunday, March 14th, 2010. 10:00am to 2:00pm \$10, family included. Visit: www.norcaltca.com for more information.

CO, DENVER: ROCKY MOUNTAIN TOY TRAIN SHOW Denver Merchandise Mart, 451 East 58th Ave. November 28-29, 2009, 10:00am-5:00pm both days. Adults \$8.00, kids 12-17 \$4.00, kids under 12 and Scouts in uniform FREE. RMSTS, 7050 South Flower Street, Littleton, CO 80128, 303-364-0274, www.RockyMountainToyTrainShow.com

FL, FORT MYERS: SCALE RAILS HOLIDAY TRAIN SHOW. ARABA Temple, 2010 Hanson St. Saturday and Sunday, November 28-29, 2009, 10:00am-4:00pm. Adults \$6.00, teens \$2.00, children under 12 free. Sponsored by Scale Rails of SW Florida. Contact Jim Edmier 239-731-0520 or jimiedmier@aol.com

FL, MELBOURNE: TRAIN & TOY SHOW. Azan Shrine Center, 1591 W. Eau Gallie Blvd. Saturday, December 5, 2009, 9:00am-2:00pm. Adults \$5.00, under 10 free with adult. Questions - Dealer Tables call 321-267-3622 or 321-757-0265.

FL, TAMPA: 5TH ANNUAL TAMPA MODEL TRAINS SHOW & SALE Florida State Fairgrounds (Special Events Center), Saturday, December 19, 2009, 9am-5pm and Sunday, 2009, 10am-4pm. Adults \$8, under 12 free. Over 250 tables. Award winning operating layouts! Altman, PO Box 985, Land O Lakes, FL 34639. 813-949-7197. E-mail: gse99@aol.com

IL, JOLIET: WILL COUNTY MODEL RAILROAD CLUB ANNUAL SWAP MEET. VFW Hall Post No. 5788, 1026 East 9th Street, Lockport, IL. Sunday, December 6, 2009, 9:00am-3:00pm. Admission \$3.00 per person, children under 12 free. Dealers welcome. Contact Brian 815-730-1785 or e-mail: WillCityModelRR@yahoo.com

IN, INDIANAPOLIS: THE INDIANAPOLIS MODEL RAILROAD SHOW AND OPEN HOUSE Manual High School Gymnasium, Saturday, December 12th, 2009, 10:00am-3:00pm. Admission \$5.00, children 12 & under free. Boy Scouts in uniform Free. Naptown & White River Model Railroad Club. Contact: Seven Handy, 317-786-8627, Website: <http://www.naptownrr.org>

IN, MICHIGAN CITY: DUNELAND MODEL RR CLUB TRAIN SHOW AND SWAP MEET. IBEW Building, 301 East 8th St. Sunday, November 29, 2009, 10:00am-3:00pm (Chicago time). Adults \$3.00, youths 6-13 \$1.00, 5 and under free. Contact: Don Nagdeman 219-879-1196, dmcrcman@sbcglobal.net or Matt Bim-Merle 219-872-5157, mlwkrd@gmail.com

IN, ROCHESTER: 4-H CLUB MODEL RAILROAD SWAP MEET Fulton County Fairgrounds, 1009 West Third Street, Saturday, November 7, 2009, 11:00am-3:00pm. Admissions: \$3.00 per person, children under 12 free, \$5.00 per family. For more information contact: Richard or Allison Earp, 574-542-2722, rcarp@embarqmail.com or Marvin Good 574-542-4531.

KY, BUCKNER: OPEN HOUSE K&I MODEL RAILROAD CLUB. Old Buckner Fire House, on Hwy 146, December 5th through December 6th, 2009. Saturday, 10:00am to 4:00pm, Sunday, 11:00am to 4:00pm. HO scale layouts. For more information contact: Barry Barmore at 502-425-8193.

MA, MARLBOROUGH: HUB DIVISION NER/NMRA. Royal Plaza Trade Center, 181 Boston Post Road West (Rte. 20), Saturday, December 5, 2009, 10:00am-5:00pm; Sunday, December 6, 2009, 10:00am-4:00pm. Adults \$7.00, Seniors (60+) \$6.00, Under 12/Scouts in uniform FREE. Information: Jerry 339-788-0967; Mark 508-528-8587; e-mail info@hubdiv.org; website: www.hubdiv.org

MI, DETROIT: DETROIT HISTORICAL MUSEUM GLANCY TRAINS SHOW. 5401 Woodward Avenue, across from DIA, Sunday, December 27, 2009, 12:00pm-5:00pm. Free w/museum admission. Appraisals, Door Prizes, Repair Advice, Videos, Glancy Trains exhibit/operating layout. Tables \$10.00 before December 1st, \$15.00 thereafter. Information: Cash Benford 313-675-5484, e-mail glancytrains@yahoo.com

MI, EAST LANSING: LANSING MODEL RAILROAD CLUB SHOW AND SALE. Michigan State University Pavilion, Sunday, November 22, 2009, 10:00am-4:00pm. Adults \$6.00, children under 12 free. Mid-Michigan's largest show w/over 450 tables. Show flyer, forms and map www.lmrc.org or call Ron St. Laurent 517-347-1831.

MI, DETROIT AREA'S PREMIER ONE-DAY TRAIN SHOW & SALE. First Sunday in March and November. Presented by GRATIOT VALLEY RAILROAD CLUB. Adults \$5.50, under 12 free. 10am to 4pm. Layouts, clinics, door prizes, 400+ vendor tables. Details at www.gvrr.org or call 586-468-4877.

MN, ST. CLOUD: GRANITE CITY TRAIN SHOW AND SALE. National Guard Armory, 1710 Veteran's Drive, Saturday, December 5, 2009, 9:00am-3:30pm. \$4.00, 12/under free. Buy/sell model/toy trains, books, videos, railroad collectibles. Operating displays. Children's railway play area. Win a Lionel Hogwarts Train Set! 320-255-0033: edwardolson@cloudnet.com; www.granitecitytrainshow.com

MO, BRANSON/HOLLISTER: WHITE RIVER VALLEY DEPOT CLUB OPEN HOUSE. 251 St. James St. December 3, 4, 5, 2009. Free. Seminars, Workshops, Make & Take. Pre-Registration Required. Operating Layouts MRC DCC HO, O, G & N. Events Schedule & Info: TPA Hobby Center, 417-335-6624 or E-mail tpahobby@aol.com

MO, JOPLIN: MUSEUM COMPLEX TRAIN SHOW AND SWAP MEET In Schifferdecker Park, 7th Street & Schifferdecker between the golf course and pool. November 28, 2009, 9:00am-3:00pm. \$3.00 adult, under 12 free. Rick Gardner, 11486 County Ln. 214, Oronogo, MO 64855; 417-673-4888 or e-mail rickgardner@softnet.com

MO, SUNSET HILLS: OZARK DIVISION TCA: GREAT ST. LOUIS CHRISTMAS TRAIN SHOW. Life Christian School, 13001 Gravois Rd. Saturday, December 5, 2009, 9:00am-3:00pm. Admission \$5.00, children 12 and under free. Jon Lundvall, 314-239-7996 or jonlstrains@netscape.net

NC, WILMINGTON: CAPE FEAR MODEL RAILROAD SOCIETY 13TH ANNUAL SHOW & SALE American Legion Post 10, 702 Pine Grove Drive, January 30-31, 2010, Saturday 10:00am-5:00pm, Sunday 10:00am-4:00pm. \$5.00 adults, \$3.00 children 6-12, under 6 free. 43 tables, free clinics, operating layouts. www.CapeFearModelRailroadClub.org

NJ, MAGNOLIA: 2ND ANNUAL MODEL TRAIN SHOW Community Hall, Albertson & Brook Ave. Saturday, November 21, 2009, 9:00am-3:00pm. Adults \$5.00, 11-13 \$3.00, children free. Food, drink, door prizes. Free parking. Information Mert Gardner 856-784-8251.

NY, ALBANY: ANNUAL "GREAT TRAIN EXTRAVAGANZA" 2009 Empire State Convention Center, Sunday, December 6th, 10am-4pm. \$5 adults, children free. Operating layouts, 200+ tables of model trains, train sets, parts, accessories, scenery items, books, videos, DVDs, prints, railroad memorabilia. Educational displays. Seminars. www.gtealbany.org 518-371-9164.

NY, BINGHAMTON: ROBERSON'S TRAINS AND HOBBY FAIR. Roberson Museum, 30 Front St. January 10, 2010, 9:00am-4:00pm. \$5.00 adults, \$4.00 seniors & students, children under 5 free. See and shop! For more information call 607-772-0660.

OH, COLUMBUS: 46TH BUCKEYE MODEL TRAIN SHOW Ohio Expo Center (Lausche Bldg), 717 E. 17th Ave., Saturday, December 12, 2009, 9am-4pm. Adults \$6, under 12 free. Operating layouts, 300+ tables. Gordon Hartranft, 58 Creed Circle, Campbell, OH 44405. 330-755-1914.

OH, KIRTLAND (CLEVELAND): LAKELAND COLLEGE ALL SCALE TRAIN SHOW. Lakeland Community College, State Route 306 and Interstate 90. Saturday, December 19, 2009, 10:00am-4:00pm, Sunday, December 20, 2009, 11:00am-3:00pm. 200 tables, HO trains, structures, accessories. Operating layouts, food, free parking. Admission \$7.00, tables \$35.00. Info: 440-256-8141.

OH, MASSILLON: CJ TRAINS WINTER MASSILLON TRAIN AND TOY SHOW Knights of Columbus Hall, 988 Cherry Road NW. Sunday, December 13, 2009, 10:00am-3:00pm. \$4.00 admission, 12 and under free. \$20.00 dealer table. Jon Ulbright, 941 Buchholz Drive, Wooster, OH 44691, Phone after 6:00pm, 330-262-7488, cathijon@ssnet.com www.cjtrains.com

OH, SPRINGFIELD: SPRINGFIELD AREA MODELERS MODEL TRAIN SHOW AND FLIT MARKET. Clark County Fairgrounds, 1-70, Exit 59. December 6, 2009, 11:00am-4:00pm. \$5.00, under 12 free. Robert Chaffin, Jr., 2706 Lagonda Ave., Springfield, OH 45503, 937-399-6647.

PA, COOPERSBURG: COOPERSBURG AREA SOCIETY OF MODEL ENGINEERS OPEN HOUSE. Basement of the Coopersburg Borough Building, 5 North Main St. December 5-6, 2009, January 9-10 and January 16-17, 2010, Noon to 5:00. Admission: Free. Info: J&D @ 215-538-0501 www.casme.org

PA, GLENSIDE: 6TH ANNUAL TOYS FOR TOTS TRAIN SHOW. North Penn VFW Post 676, 2519 Jenkintown Rd. Saturday, November 21, 2009, 9:00am-2:00pm. Adults \$3.00, kids under 12 free. Sponsored by The Marine Corps League #1023. N scale train layout raffle \$5.00 per ticket. Information- Mark Carver 215-264-2869.

PA, HORSHAM: MAIN STREET TRAIN SHOW Keith Valley Middle School, 227 Meetinghouse Rd. Saturday, December 5, 2009, 10:00-4:00pm. \$5.00 adults, under 12 free. Al Wiplinger 215-672-7390, villagehdw@aol.com

PA, MONACA: BEAVER COUNTY MODEL RR FALL TRAIN SHOW & SALE. Center Stage, 1495 Old Broadhead Road, Sunday, November 22nd, 2009, 10:00am-3:00pm. Adults \$4.00, under 12 free. Sponsored by Beaver County Model RR & Historical Society. Contact: Glenn Wallace 724-775-8023 or www.bcmrr.railfan.net or info@bcmrr.railfan.net

VA, FAIRFAX: WB&A CHAPTER TCA ANNUAL CHRISTMAS TOY TRAIN SHOW. Kena Temple, 9001 Arlington Blvd, Route 50 West, December 12, 2009, 9:00am-3:00pm. Admission \$5.00, Tables available for TCA members, train doctor, parts, new and collectables, Santa. Info: Pete Jackson, 703-455-6154, Kenameet@wbchapter.org

WA, KENT: BOEING EMPLOYEES MODEL RAILROAD CLUB ANNUAL SWAP MEET Kent Commons, 525 - 4th Avenue North, November 14, 2009, 9:30am-4:00pm. \$6.00 adults, children 14 and under free. Ed Sherry, 550 SW Colewood Lane, Normandy Park, WA 98166; 206-244-3884; swapmeet@bcmrrc.com

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A

Albion Software	105
All Electronics Corp.	104
Allegheny Scale Models	104
Allen Keller Productions	103
Amherst Railway Society, Inc.	100
Ashlin Trains RR Miniatures	104
Atheam	7
Atlas Model Railroad Co., Inc.	2
Axian Technology	75
Aztec Manufacturing	105

B

B.T.S.	96
Bachmann Industries, Inc.	27
Bakatronics, LLC.	104
Bessemmer Hobbies	104
Bill's Trains and Track	103
Black Forest Hobby Supply Co.	105
Blair Line, LLC.	63
BLMA	33
BPL	103
Bragdon Enterprises	102
Broadway Limited Imports, LLC	47
Bullfrog Snot	91

C

Caboose Hobbies	30
Caboose, The	26
Caboose Industries	77
CadRail/Sandia Software	85
Chicago & N Wstrn Historical	105
Circuitron	81
Clover House	103
CMW Holdings, Ltd./Classic Metal	91
Collectibles Insurance Agency	75
Con-Cor International	86
Cribscapes.com	91
Cripplebush Valley Models	102
Custom Model Railroads	33

D

DC/DCC Dealer Association	25
Des Plaines Hobbies	81
Digitrax	32
Division Point, Inc.	96
Don Black Brass Trains	103

E-F

ESU, LLC.	87
Euro Model Trains	86
Euro Rail Hobbies & More	102
Evan Designs	89
ExactRail, LLC.	3
Fifer Hobby Supply	105
Fine Scale Miniatures	17
First Place Hobbies	88

G

GML Enterprises	105
Gotham Model Trains	104
Grand Central Gems, Inc.	105
Great Midwest Train Show	29
Great Train Expo	29
Greenberg Shows	29

H

H & R Trains, Inc.	87
--------------------	----

Hawkins Rail Services	33
Head Electronics	105
Herpa Model Cars	102

I-J

IBL Products	104
Imagine That Laser Art	102
Innovative Train Technology	103
Internet Hobbies	87
J & T Junction	104
Jam Creations.net	104
Jelsma Graphics	105
Jordan Products	103
Just Trains	32

K-L

Kadee Quality Products	105
Kaslo Shops	103
KATO USA, Inc.	115
Kreigh Haus Hobby & Coins	103
Larc Products	102
Layout Vision	33
Ligar Technologies	102
Litchfield Station	102

M

Magic Water	104
Mailcar Hobbies	104
Mainline Hobby Supply	63
Matysik Displays, LLC.	103
MB Klein	33
Micro Engineering	30
Micro Fasteners	103
Micro Locomotion	104
Micro-Mark	88
Micro-Trains Line	85
Mizell Trains	104
Model Railroad Planning 2010	101
Model Railroad Books	89, 97, 90, 99
Model Railroader magazine	113
Model Railroader Sweepstakes	18-19
Model Railroads By Chris	63
Model Rectifier Corp.	116
Model Structures for Model RR	102
Model Trains By Design	103
Modellbahn Ott, Inc.	102
ModelRailroader.com	91, 100
MTH Electric Trains	87

N

N Scale Railroading Magazine	63
N Scale Supply	63
NCE Corp	26
Nicholas Smith Trains	75
NKP Layout Services	102
Northern Scale Models	105
Novacon, Ltd.	102

O-P

O Scale Resource	103
Osborn Model Kits	102
Pacific Western Rail Systems	86
PanaVise Products	105
PECO Products	89
Plastruc, Inc.	33
Pop's Custom Model Railroads	104
Progressive Model Design	104
Procraft	83

R

RailDreams, Inc.	81
Railmaster Hobbies	102
Railroadbooks.biz	102
Rainy Day Hobbies, LLC.	96
Rapido Trains	5
Ready To Roll, Inc.	75
Reynauld's Euro Imports	103
Rib Side Cars	105
River Point Station	102
RR In A Box	105
RS Laser Kits	103
Rusty Stumps Scale Models	103

S

San Diego Railroad Museum	91
Scale Models Arts & Tech, Inc	30
Sceniking	104
Sedalia Hobby	103
Shelf Layouts Company	103
Showcase Express	63
Sievers Benchwork	33
Signature Press	83
Silvergate Distributors	14
Solid Design	102
SoundTraxx	90
Standard Hobby Supply	15
Strasburg Rail Road Shops	87
Sunday River Productions	14

T

Tahoe Model Works	105
Tangent Scale Models	14
TDP, Inc.	88
TF Train and Hobby	104
The Coach Yard	77
The Peanut Butter of Trains	102
Timberline Scenery	26
TK Train and Hobby	103
Tony's Train Exchange	83
ToolsGS	102
Toy Train Heaven	104
Trackside Displays	14
Trackside Layouts, LLC.	103
Trackside Prints & Hobbies	104
Train Central	105
Train Collectors Association	96
Train World	22-23
Trainboxes Plus	105
TrainPlayer Software	77
Trains Emporium	103
trainsetsonly.com	105
TreatStation	105

U-Z

Ulrich Models	104
What-Detail!	102
Wig Wag, LLC	63
Wireless Micro Color Cam	102
Wm K Walthers	21, 25, 31, 85, 96
Woodland Scenics	9
Woodstock Hobbies	105
World's Greatest Hobby on Tour	29
Xuron	26
Yankee Dabbler	104
Ye Olde Huff N Puff	105

Model Railroader MAGAZINE



NEXT ISSUE

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The Operators

Andy Sperandeo



At Burbank Junction, the conductor of Southern Pacific Train 803 from Los Angeles picks up a clearance card authorizing his train over the Mojave Subdivision of the San Joaquin Division. Stanley Groff photo

Authority to use the main track – part 1

A railroader explaining operation to a group of modelers began by emphasizing that there two kinds of track, main tracks and everything else. On anything other than a main track, he told us, crews can do their jobs without specific authority to move from A to B, protected by rules that movements on other than main tracks should be slow enough to avoid accidents.

But on main tracks trains run too fast to stop within sighting distance of other trains or obstructions. They must be kept apart by adherence to rules, schedules, and signal indications. In particular, a train or engine needs specific authority to occupy or use the main line from its initial station on any district or subdivision until it completes its prescribed run. The different ways of granting that authority make one system of

operation distinct from another. Here are some forms of authority that are useful in model railroad operation. (In addition, see “Yard limits,” *The Operators*, in the February 2007 *Model Railroader*.)

Timetable and train order. Trains are authorized by timetable schedules under rules for the superiority of trains. Both schedules and superiority are subject to modification by the dispatcher in the form of written train orders.

The basic document needed, in addition to the current timetable and rule book, is the clearance card. Often but not always called “Form A,” the clearance gives a scheduled train authority to proceed on its schedule, and also serves as a receipt listing any train orders or messages being delivered at the same time.

The dispatcher can also authorize extra trains not scheduled in the timetable. See “Running extra trains,” *The Operators* column in the November 2009 MR.

Signal indications. A railroad operating by timetable and train orders may have an automatic block signal system to increase its capacity. On a single main track, automatic signals don’t convey authority to occupy the main, but do serve as safeguards in case crews exceed their authority.

However, on two or more main tracks with a “current of traffic,” automatic signals may convey authority to trains running in the designated direction, typically under Rule 251. The signals protect following trains, and opposing trains run on different tracks.

Usually a clearance is all that’s needed to authorize a scheduled train at its initial terminal, and where allowed in the employee timetable that could be true for extra trains too under Rule 251.

Centralized Traffic Control, or CTC, is a system to remotely operate interlocked control points that may extend over an entire operating district or subdivision. The dispatcher monitors train movements on an office display and sends instructions for the system to line turnouts and clear signals at the control points. The CTC system has built-in safety checks – the interlocking – that prevent it from clearing conflicting movements, so it protects both opposing and following trains. Between control points, intermediate signals function automatically.

With CTC the governing rule was most often Rule 261, with trains originally authorized at their initial stations with a clearance card, and proceeding over the road on the authority of the signal indications. In later practice verbal clearances radioed to trains at initial stations became accepted.

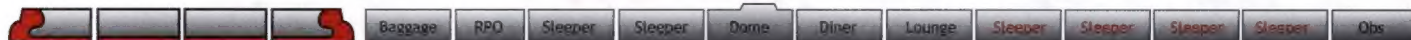
Next month I’ll get into track warrant authority and how these different forms of authority can work in model operation. **MR**

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